



SATURDAY, AUGUST 28, 1875.

Contributions.

SAFETY-VALVES.

BY RICHARD H. BUEL.

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(Concluded from page 344.)

Mr. Thomas Adams, of Scotland, constructs a valve with a projecting lip, *A*, Fig. 16. By applying steam gauges at the points shown on the sketch, he observed that they gave the indicated readings at the time the valve opened, and that then the pressures began to lower, around the valve first, and lastly in the boiler, when the valve suddenly closed. He proportions a 3-inch valve for 100 pounds pressure to have a lift of five-sixteenths of an inch. Finding by experiment that the spring used requires a load of 138 pounds to compress it this amount, he makes the area of the lip sufficient to produce this load when acted upon by steam having a pressure of 25 pounds per square inch. All good safety valves must be proportioned somewhat after this manner. It is better to make the direct experiment with steam gauges for any particular case, as Mr. Adams has done; but if this is not convenient, different forms of valves must be tried, until the right proportions of the parts are determined.

There are several valves made on the same general principle as that just described. The Richardson valve, Fig. 17, is very well known, and largely used in this country. The valve has a curved lip, *A*, and there is a recess, *B*, surrounding the seat. It is claimed by the inventor that the recoil of the escaping steam produced by this arrangement gives a higher lift to the valve. Some experiments were made with this valve by order

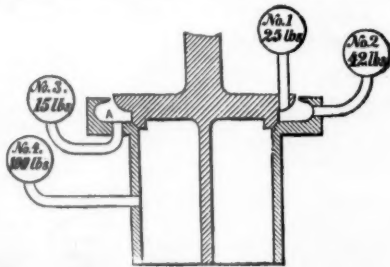


Fig. 16

of the Navy Department, in 1873. The boiler to which the valve was attached was first fitted with a common valve 4 inches in diameter, which let the steam pressure increase 5 pounds in 4 minutes beyond the point for which it was set, when the furnace doors were closed, and a 3-inch common valve allowed the pressure to increase 9 pounds in 6 minutes, under the same circumstances. A Richardson valve, 3 inches in diameter, being attached, the pressure could not be increased beyond the point for which the valve was set, and it closed promptly on a slight reduction of the steam pressure. The common safety-valve being set to open at different pressures gave the same amount of lift in each case, as far as could be observed, while the Richardson valve gave an increased lift for each increase of pressure at which it was set.

A competitive trial of safety-valves was recently conducted in England, for a prize of 500 dollars offered by the Editor of the *Nautical Magazine*. A sketch of the Rochford valve, to which the prize was awarded, is shown in Fig. 18. It will be seen that it has a projecting lip, *A*, and the spring is inclosed in a case, *B*, which can be filled with oil if desired, for the preservation of the spring. In the trial, the valve was attached to a Lancashire boiler, 33 feet long, 7 feet 2 inches in diameter, flues 2 feet 8 inches in diameter, grate surface 30 square feet; being set to blow off at 60 pounds,

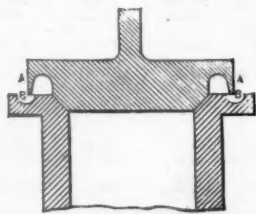


Fig. 17

the pressure could not be increased beyond 63½ pounds by the most severe firing, and when it fell to 60 pounds, the valve closed promptly.

Instead of having a projecting lip on the valve, a piston is sometimes attached to it, which is exposed to the action of steam at rest. The Rochow valve, Fig. 19, furnishes a good illustration of this principle. A piston, *A*, is attached by a stem to the valve, and the tube in which it works is extended into the boiler by a pipe, *C*, so as to be acted upon by quiescent steam. A ring, *B*, nearly closes the orifice by which steam is admitted to the valve proper, when it is seated; and as the valve rises, the ring opens the orifice more and more. From this description it will be evident that when the valve rises a little, the pressure above the piston will be reduced, and consequently there will be an unbalanced pressure on the under side of the piston to raise the valve higher, and by giving

a proper proportion to this piston any required lift can be obtained. In the form represented in the sketch, the valve is arranged to be loaded with a weight, and there is a stop at *D* to check the valve when it has lifted high enough. The piston and ring do not work steam tight, but are fitted loosely, so that they can move without friction.

In these illustrations, while only a few of the most prominent valves have been noticed, it is believed that no important principle of construction has been overlooked. It is a matter of regret that more information cannot be given on this part

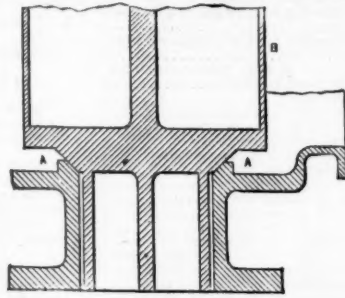


Fig. 18

of the subject, but, as before remarked, the record of experiments from which general rules can be deduced is very slight. Enough has been said, however, to show that there are good safety-valves in the market.

There is one experiment that every one who uses a safety-valve can make, to see whether he has a valve that is proportioned to give the proper lift. Let him secure a cord to the lever or stem of the valve, so that it can be opened by hand if necessary. (Indeed, it may be said, in passing, that some convenient arrangement should always be fitted for opening the valve by hand, and it should be used at least once a day, to keep the valve in working order.) Then, by shutting off steam from the engine or wherever else it is used, and making up a good fire in the boiler, he can determine in a very short time whether or not he has a safety valve; and if it will not relieve

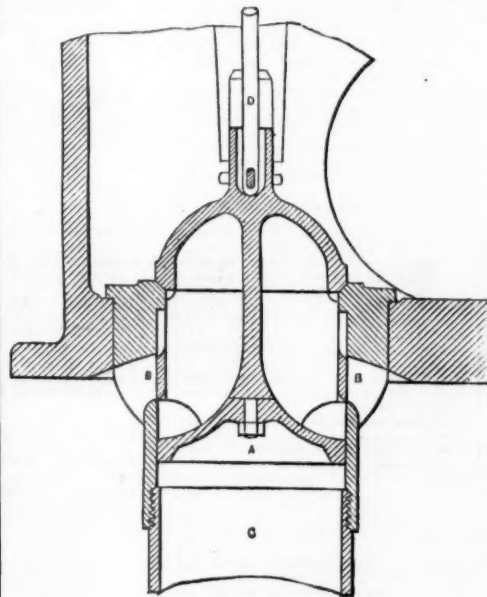


Fig. 19

the boiler automatically it will be easy to give a larger opening by hand, so that the experiment will not be attended with danger. This simple experiment is earnestly recommended to every steam user, for with a good safety-valve in working order the chances of a disastrous boiler explosion are greatly diminished.

V. THE RELATIVE MERITS OF VALVES LOADED WITH WEIGHTS AND SPRINGS.

The best manner of loading a safety-valve has been the subject of animated discussion among engineers. The opinion of the majority can be summed up as follows:

Safety-valves for the boilers of locomotive and steamers, and in all cases in which they will be subjected to oscillations and jars, should be loaded with springs. For stationary boilers,

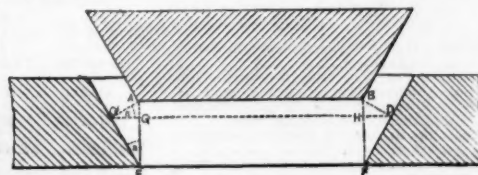


Fig. 20

either weights or springs can be used at pleasure. In employing a spring it is generally considered best to arrange it so that it shall be compressed, rather than extended, when the valve is raised.

VI. APPENDIX.

The demonstrations of the rules given in a former part of this paper, for finding the opening due to a given lift of a valve, when it does not rise clear of the seat, and for determining the area of opening necessary to discharge a given weight of steam of known pressure, are appended.

a.—The area of opening of a valve with a beveled seat, for a lift $A E = l$, Fig. 20, is the area of the frustum of a cone whose

upper base $A B = D$, has the same diameter as the valve, and whose lower base, $C D$, measured from points, C , D , where perpendiculars from A and B intersect the seat, is equal to

$$D + C G + H D = D + 2 C G$$

the slant height being $A C$ or $B D$. The area of this surface is equal to the half sum of the circumferences of the upper and lower bases multiplied by the slant height, or the area of opening due to the lift $l = \frac{3.1416 (2 D + 2 C G) \times A C}{2}$.

The angle of bevel, $A E C = a$, and the angle $A C G$ is also equal a . From trigonometry, in the triangle $A E C$,

$$\text{Sine } a = \frac{A C}{A E} = \frac{A C}{l}$$

$$A C = l \times \text{sine } a.$$

In the triangle $A C G$,

$$\text{Cosine } a = \frac{C G}{A C} = \frac{C G}{l \times \text{sine } a}.$$

$$C G = l \times \text{sine } a \times \text{cosine } a$$

Substituting these values in the previous equation:

$$\begin{aligned} \text{Area of opening} &= \frac{3.1416 (2 D \times l \times \text{sine } a \times \text{cosine } a)}{2} = l \times \text{sine } a \\ &= 3.1416 [D \times l \times \text{sine } a + l^2 \times (\text{sine } a)^2 \times \text{cosine } a] \end{aligned}$$

If $a = 45^\circ$,

$$\text{Sine } a = 0.707, \text{ cosine } a = 0.707$$

$$(\text{Sine } a)^2 = 0.5$$

$$(\text{Sine } a)^2 \times \text{cosine } a = 0.3535$$

Whence, area of opening—

$$= 3.1416 (D \times l \times 0.707 + l^2 \times 0.3535)$$

$$= 2.22 \times D \times l + 1.11 l^2$$

If $a = 33^\circ$,

$$\text{Sine } a = 0.5, \text{ cosine } a = 0.866$$

$$(\text{Sine } a)^2 = 0.25$$

$$(\text{Sine } a)^2 \times \text{cosine } a = 0.2165.$$

Area of opening—

$$= 3.1416 (D \times l \times 0.5 + l^2 \times 0.2165)$$

$$= 1.57 \times D \times l + 0.68 \times l^2$$

b.—Let

A = area of opening required to discharge W pounds of steam at the pressure P per hour. The quantity discharged by this opening per second will be, approximately,

$$\frac{P \times A}{70}$$

Hence the quantity discharged per hour,

$$W = \frac{P \times A \times 3600}{70}$$

$$= 51.43 P \times A, \text{ nearly,}$$

And—

$$A = \frac{W}{51.43 \times P}$$

The Rolling of the Stevens' Rail.

LAMBERTVILLE, N. J., August 21, 1875.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The notice, in your issue of this date, of the pattern of rail adopted by Mr. Robert L. Stevens, in 1830, and laid in 1831-2, reminds me of the following incident:

On the 21st of October, 1850, I called with Mr. Stevens at the office of Mr. Charles Augustus Davis, of the firm of Davis, Brooks & Co., in the lower part of the city of New York. That firm will be remembered as large importers of rails. Mr. Davis will also be remembered by those whose memories go back to General Jackson's administration as the author of the celebrated Jack Downing letters. In the course of the conversation old recollections came up, and Mr. Davis said to Mr. Stevens substantially as follows: "Do you remember when you sat where you do now, and I reported to you the answer from England that they could not roll the H shaped rail you proposed, and then you made a sketch on a sheet of paper lying on this table showing how it could be done?" And then to me: "I sent the sketch, and it was done, and all rails rolled since have been rolled that same way." Mr. Stevens' plan, as I understood, was to lay the rail on its side and let one-half of the head and base go into grooves in each roll. It seems strange to us that this now universal mode did not at once occur to the rail-makers.

Whether any one else had suggested the H form before Mr. Stevens adopted it I do not know, but it seems certain that no one had produced or been able to produce such rail, before he showed Mr. Davis how it could be rolled, probably in 1830.

ASHBEL WELCH.

Traffic of Single-Track Railroads.

TO THE EDITOR OF THE RAILROAD GAZETTE:

On the Eastern Division of this road, all of which is single track, 92 miles long, there was the following number of cars moved in July, 1875: 20,882 loaded and 12,314 empty 8-wheel cars, a total of 33,196. The greatest number moved in one day during this month was on July 12—812 loaded and 651 empty cars; total, 1,467. On August 9, 1875, 1,060 loaded and 564 empty, total, 1,624 cars, were moved. On August 29, 1874, 995 loaded and 651 empty, total, 1,646 cars, were moved. In addition to this there were eight passenger trains and three gravel trains on the road each day.

The Susquehanna Division of the Northern Central Railway, from Sunbury to Marysville, 47 miles, all but 19 miles of which is single track, is also operated in connection with the Eastern Division with one set of train despatchers, and the total number of cars moved over this Division the same month was 33,975 cars. We think this will compare very favorably with most single-track roads in this country.

The average business daily will amount 1,250 to 1,300 cars.

—The Attorney General of Minnesota has given his opinion that Mr. C. A. Gilman, the Republican, and Mr. J. W. Sencerbox, the Democratic candidate for the office of Railroad Commissioner of Minnesota, are ineligible to that office under the State constitution, both of them having been members of the Legislature which passed the present law providing for the election of a Commissioner. Both gentlemen have accordingly withdrawn, leaving other candidates to be nominated.

General Railroad News.

ANNUAL REPORTS.

Louisville & Nashville.

This company owns 605.18 miles of railroad, and leases 132.80, making 737.98 miles worked by it, as follows:

Owned.	Miles.
Main stem, Louisville south by east to Nashville.....	185.00
Bardonia Branch.....	17.30
Knoxville Branch.....	110.32
Richmond Branch.....	33.46
Memphis Line, junction with main stem at Bowling Green, Ky., southwest to Memphis.....	259.10
Leased.	
Glasgow Railroad.....	10.50
Nashville & Decatur Railroad.....	122.30

Total..... 737.98
At the close of the year ending June 30, 1914, it had 197 locomotives, 79 passenger coaches, 27 baggage, 5 postal and 12 express cars, 1,774 box, 40 caboose, 337 stock, 513 gondola, 396 flat and 144 low flat cars, 48 boarding, 9 wrecking and 18 tool cars.

The company owns a majority of the stock of the South & North Alabama Railroad Company, which is largely indebted to it for advances made for improvements and for paying interest on bond which the net earnings have been insufficient to cover. On this road fourteen of the Louisville & Nashville's engines, four of its passenger cars, 446 of its freight, and three of its service cars were in use at the close of the fiscal year.

The total cost of the road and equipment is reported as \$23,691,299.31, which is at the rate of \$33.148 per mile of road owned. But it has other assets amounting to nearly one-fourth more, and the consolidated general account is as follows:

Assets.	
Cost of road to date.....	\$23,691,299.31
Sundry railroad bonds.....	283,188.27
Sundry railroad stocks.....	1,073,481.05
Louisville Bridge Co. stock.....	363,200.00
Pullman Southern Car Co. stock.....	84,000.00
Real estate, timber and quarry lands.....	115,205.54
Shop and fuel stock.....	926,205.10
Cash in Louisville, New York and London.....	589,476.54
Due from Transportation Department.....	288,194.75
Due from sundry railroads and persons.....	174,115.98
Due from South & North Ala. R. R. Co.....	1,111,250.96
Due from Nashville & Decatur R. R. Co.....	528,841.58
Total.....	\$29,233,762.11

Liabilities.	
Capital stock (\$14,846 per mile).....	\$8,984,601.13
7 per cent. bonds.....	\$10,775,000.00
10 per cent. bonds.....	2,000.00
6 per cent. bonds.....	3,990,000.00
(\$24.401 per mile).....	14,767,000.00
Bills payable.....	2,095,354.95
Accounts payable.....	768,935.45
Interest and dividends due.....	136,837.64
Profit and loss.....	2,481,032.94
Total.....	\$29,233,762.11

Of the bonded debt, \$849,000 is issued by the city of Louisville and is not a lien on the road, though it pays the interest, and is, we believe, to pay the principal when due. In this form it is equivalent to long-dated paper.

The floating debt of \$3,001,128 is nearly at the rate of \$5,000 per mile of road owned. The assets outside of road and equipment are nearly twice as great, but most of them are not realizable. A note to the reports says that since the close of the fiscal year covered by it (which was fourteen months ago), a ten-year mortgage for \$4,000,000 had been issued, and part used as collateral; \$500,000 of these bonds had been sold, and by the sale of \$1,500,000 more, with other assets of the company, the floating debt could be retired. The other \$2,000,000 it is proposed to cancel.

Taking the results of working for the entire 738 miles worked by the company, we have the following work done:

	1873-74.	1872-73.	Inc. or Dec.	P. c.
Freight-train miles.....	982,243	1,068,193	Dec.	85,950 8.0
Tons carried one mile.....	146,033,812	159,388,003	Dec.	13,354,191 8.4
Average tons in freight train.....	116.6	98.0	Inc.	18.6 19.0
Rev. from freight.....	\$3,172,550.45	\$3,620,841.83	Dec.	\$448,291.38 12.4
Receipt per ton-mile.....	2.172 cts.	2.271 cts.	Dec.	0.099 ct. 4.4
Expenses per ton-mile.....	1.469 cts.	1.657 cts.	Dec.	0.188 ct. 11.0
Profit per ton-mile.....	0.703 cts.	0.614 cts.	Inc.	0.089 ct. 14.5
Net freight earnings.....	\$1,027,245.43	\$978,642.34	Inc.	\$48,603.09 5.0
Prop'n of freight exp'n's to freight earnings.....	67.62 per ct.	72.96 per ct.		
Passenger train miles.....	983,816	1,074,766	Dec.	85,950 8.0
Passengers carried one mile.....	37,414,235	43,589,072	Dec.	6,174,837 14.1
Average passengers per train-mile.....	38	40	Dec.	2 5.0
Revenue from passengers.....	\$1,640,468.38	\$1,869,607.46	Dec.	\$229,139.08 12.3
Receipt per passenger-mile.....	4.385 cts.	4.289 cts.	Inc.	0.096 ct. 2.2
Expense per passenger-mile.....	3.506 cts.	3.545 cts.	Inc.	0.039 ct. 0.6
Profit per passenger-mile.....	0.819 cts.	0.744 cts.	Inc.	0.075 ct. 1.0
Net passenger earnings.....	\$306,153.78	\$324,327.34	Dec.	\$18,173.56 5.3
Proportion of passenger expenses to passenger earnings.....	81.33 per ct.	82.88 per ct.		

The receipts, in detail, and expenses were:

	1873-74.	1872-73.	Inc. or Dec.	P. c.
Receipts.....	\$1,409,646.94			
Express.....	135,435.92			
Mail.....	92,223.63			
Train privileges.....	5,157.89			
Rent of passenger cars.....	21,013.98			
Freight.....	3,172,550.45			
Rent of freight cars.....	44,578.05			
Detention of freight cars, storage, etc.....	1,365.33			
Rent of engines.....	41,402.45			
Rents.....	28,011.34			
Total.....	\$4,949,420.02	\$5,622,423.64	Dec.	\$673,003.62 12.0
Working expenses.....	3,479,617.62	4,097,134.10	Dec.	617,516.48 15.0
Net earnings.....	\$1,469,802.40	\$1,525,289.54	Dec.	\$55,487.14 3.6
Percentage of expenses.....	70.3	72.9		
Gross earnings.....	\$6,707	\$7,618	Dec.	\$911 12.0
Working expenses per mile.....	4.715	5.552	Dec.	837 15.0
Net earnings per mile.....	1.992	2.066	Dec.	74 3.6

The interest on the bonds of the roads owned amounts to \$993,650, about a seventh part of which, we believe, is in gold. The company paid a rental of \$188,988.56 for the Nashville & Decatur road (\$44,590 more than its net earnings). The amount of rental of the Glasgow Railroad is not given in the

GENERAL RESULTS OF OPERATION.

Number.		Passenger and Freight-Trains.				Mixed Trains.		
		Main Stem.	Knoxville Branch.	Memphis Line.	N. & D. Division.	Bardonia Branch.	Richmond Branch.	Glasgow Branch.
1	Length of road, miles.....	185 00	110 32	259 10	122 30	17 30	33 46	10 50
2	Cost of road and equipment.....	\$10,618,202 00	\$4,406,318 00	\$7,606,980 00	\$4,079,884 00	\$229,044 00	\$880,805 00	\$200,000 00
3	Cost of road per mile.....	\$57,395 69	\$39,941 24	\$29,359 05	\$33,355 55	13,239 54	\$24,299 80	19,047 62
Number of Daily Trains—								
4	Average number of daily trains over road, passenger.....	5.41	1.72	3.83	3.77			
5	Average number of daily trains over road, freight.....	8.78	2.57	3.70	4.07			
6	Total number of daily trains over road, passenger and freight.....	14.19	4.29	7.51	7.84	1.74	1.90	3.43
Train Mileage—								
7	Number of train miles, passenger.....	365,065	69,111	362,533	168,466			
8	Number of train miles, freight.....	598,350	103,498	349,610	181,762			
9	Total number of train miles.....	963,415	172,609	712,143	350,228	10,988	23,148	13,146
Mileage of Cars in Passenger-train—								
10	Miles run by passenger-cars.....	950,168	204,584	746,436	333,029	20,799	46,612	12,947
11	Miles run by sleeping-cars.....	375,039		477,500	92,462			
12	Miles run by baggage-cars.....	354,344	69,426	372,878	170,920	10,138	3,004	
13	Miles run by express-cars.....	115,393		6,604				734
14	Miles run by postal-cars.....	115,831						
15	Total mileage of passenger-cars.....	1,910,475	276,054	1,603,418	596,411	30,937	49,616	13,681
Number of Cars in each Passenger-train—								
16	Number of passenger-cars in each train.....	2.60	2.96	2.06	1.98	1.89	2.01	1.00
17	Number of sleeping-cars in each train.....	1.03		1.32	0.55			
18	Number of baggage-cars in each train.....	0.97	1.00	1.03	1.01	0.92	0.13	
19	Number of express-cars in each train.....	0.31	0.03	0.02				0.06
20	Number of postal-cars in each train.....	0.32						
21	Total number of passenger, sleeping, baggage, exp's, and postal cars in each train.....	5.23	3.99	4.43	3.54	2.81	2.14	1.06
Dead Weight in each Passenger Train—								
22	Weight of passenger-cars in each train, tons.....	48.10	54.76	38.11	36.63	34.96	37.18	18.31
23	Weight of sleeping-cars in each train, tons.....	32.96		42.24	17.60			
24	Weight of baggage-cars in each train, tons.....	19.40	30.00	20.60	20.20	18.40	2.60	
25	Weight of express-cars in each train, tons.....	3.72	0.36	0.24				0.72
26	Weight of postal cars in each train, tons.....	7.36						
27	Total weight of cars in each passenger train, tons.....	111.54	75.12	101.19	74.43	53.36	39.78	19.03
28	Weight of engine and tender, passenger train, tons.....	52.00	40.00	52.00	52.00	46.50	47.50	46.50
29	Total dead weight in one passenger train, tons.....	163.54	115.12	153.19	126.43	99.86	87.28	65.53
Paying Weight in each Passenger Train—								
30	Average weight of passengers in each train, at 150 lbs. per passenger, tons.....	3.82	2.77	2.61	1.96	1.76	1.07	0.69
31	Average weight of baggage in each train, at 50 lbs. per passenger, tons.....	1.17	0.92	0.87	0.65	0.59	0.36	0.23
32	Average weight of express in each train, tons.....	1.16	1.83	0.76	0.51	0.96	0.15	0.75
33	Average weight of mail in each train, tons.....	0.36	0.06	0.40	0.07	0.02	0.04	0.02
34	Total net weight in each passenger train, tons.....	6.21	5.58	4.64	3.19	3.33	1.62	1.69
35	Gross weight in passenger train, exclusive of engine and tender, tons.....	117.75	80.70	105.83	77.62	56.69	41.40	20.72
36	Total gross weight of passenger train, inclusive of engine and tender, tons.....	169.75	120.70	157.83	129.62			
37	Percentage of paying to dead weight, passenger, exclusive of engine and tender.....	5.57	7.43	4.58	4.29	6.12	4.07	8.86
Passengers Carried—								
38	No. of passengers carried one mile North.....	8,720,861	1,162,615	6,283,653	2,181,234	124,863	167,880	60,295
39	No. of passengers carried one mile South.....	8,420,427	1,394,057	6,325,376	2,217,929	133,612	161,478	59,945
40	Total No. of passengers carried one mile, North and South.....	17,141,288	2,556,672	12,609,029	4,399,163	258,475	329,358	120,240
41	No. of passengers carried in one passenger car.....	12.93	12.50	10.30	10.34	12.43	7.07	9.29
42	No. of passengers carried in one passenger train.....	46.95	38.99	34.78	26.11	23.52	14.23	9.29
Mileage of Freight Cars, and No. of Cars in Train—								
43	Miles run by freight cars, loaded, North.....	4,685,743	734,436	2,130,977	878,848	16,984	35,461	6,189
44	Miles run by freight cars, loaded, North.....	1,614,372	63,007	888,780	672,957	1,835	28,253	1,193
45	Miles run by freight cars, loaded, South.....	5,269,847	234,787	2,695,854	1,382,440	10,667	52,333	4,634
46	Miles run by freight cars, empty, South.....	863,876	545,312	355,010	183,264	9,322	13,412	3,924
47	Total No. of miles run by freight cars, loaded and empty.....	12,433,838	1,577,542	6,060,621	3,117,509	38,808	129,556	15,340
48	Average No. of freight cars in each train, loaded.....	16.78	9.36	13.81	12.44	2.52	3.75	0.82
49	Average No. of freight cars in each train, empty.....	4.18	5.88	3.50	4.71	1.02	1.80	0.34
50	Total No. of freight cars in each train, loaded and empty.....	20.96	15.24	17.31	17.15	3.54	5.59	1.16
Freight Tonnage—								
51	No. of tons of freight carried one mile North.....	34,079,331	6,619,479	17,453,794	5,232,140	131,446	236,541	41,800
52	No. of tons of freight carried one mile South.....	46,148,124	1,375,866	22,000,371	12,303,033	68,468	320,771	22,648
53	Total No. of tons of freight carried one mile.....	80,227,455	7,995,345	39,454,165	17,535,173	199,914	557,312	64,448
54	Percentage of North to South tonnage.....	73.71	481.11	79.33	42.53	191.97	73.74	184.56
55	Percentage of paying to dead weight, freight.....	75.91	59.63	76.71	66.17	60.45	50.65	49.19
56	Average No. of tons of freight carried in one loaded car North.....	7.27	9.01	8.19	5.95	7.74	6.67	6.75
57	Average No. of tons of freight carried in one loaded and empty car North.....	5.41	8.30	5.82	3.37	6.98	3.71	5.66
58	Average No. of tons of freight carried in one loaded car South.....	8.76	5.86	8.16	8.90	6.42	6.13	4.89
59	Average No. of tons of freight carried in one loaded and empty car South.....	7.52	1.76	7.21	7.86	3.43	4.85	2.85
60	Total average No. of tons of freight carried in each car.....	6.45	5.07	6.52	5.82	5.15	4.30	4.20
61	Net weight carried in one freight train North, tons.....	114.88	127.91	99.85	87.56	23.92	20.43	6.35
62	Net weight carried in one freight train South, tons.....	155.55	26.59	125.85	135.37	12.46	27.72	3.44
63	Average net weight carried in one freight train, North and South, tons.....	135.21	77.25	112.85	96.47	18.19	24.08	4.90
64	Dead weight carried in one freight train, exclusive of engine and tender, tons.....	178.16	129.54	147.13	145.77	30.09	47.51	9.96
65	Gross weight carried in one freight train, exclusive of engine and tender, tons.....	313.37	206.79	259.98	242.24	104.97	112.99	35.18
66	Weight of freight engine and tender, tons.....	58.00	47.50	58.00	58.00	46.50	47.50	46.50
67	Gross weight carried in one freight train, inclusive of engine and tender, tons.....	371.37	254.29	317.98	300.24	151.47	160.49	82.08
Earnings—								
68	Earnings of passenger trains.....	\$715,213 32	\$108,376 49	\$568,191 61	\$303,037 29	\$10,253 81	\$14,722 58	\$7,404 14
69	Earnings of freight trains.....	1,633,930 54	213,924 23	794,539 16	456,720 51	11,003 42	19,054 05	11,460 96
70	Total earnings of trains.....	2,349,143 86	322,300 72	1,362,730 77	659,757 80	21,256 73	33,776 63	18,865 10
71	Earnings from miscellaneous sources—rent of rolling stock, and passenger and freight.....	126,590 41	1,105 27	4,400 75	8,188 20	263 44	174 56	65 00
72	Gross earnings.....	2,475,734 27	323,406 99	1,367,131 52	667,946 00	21,520 17	33,951 19	18,930 10
73	Gross earnings per mile of road, including miscellaneous.....	13,382 35	2,931 63	5,276 46	5,461 54	1,243 94	1,014 68	1,802 87
74	Earnings per train mile, passenger, exclusive of miscellaneous earnings, cents.....	195.914	156.815	156.728	120.521	93.314	63.602	56.322
75	Earnings per train mile, freight, exclusive of miscellaneous earnings, cents.....	275.373	206.694	227.264	251.274	100.140	82.314	87.182
76	Earnings in excess of operating expenses, passenger.....	\$192,498 11	\$21,404 58	\$102,225 23	*\$16,339.12	\$1,507.35	\$2,107.20	\$2.37
77	Earnings in excess of operating expenses, freight.....	577,156.12	64,532 16	225,516.59	162,549.95	3,567.27	*2,760.69	6,162.86
78	Total earnings in excess of operating expenses, inclusive of miscellaneous.....	896,544.54	87,042.01	322,142.57	144,399.03	5,336.06	*\$478.87	6,219.75
79	Net earnings per mile of road.....	\$444.57	789.00	1,281.91	1,180.69	308.56	*\$14.31	592.36
80	Net earnings per train mile, passenger, cents.....	52.730	30.971	28.197	*\$9.69	13.7181	9.1034	0.0172
81	Net earnings per train mile, freight, cents.....	97.271	62.351	83.928	89.928	32.4651	*\$11.9263	46.8011
82	Earnings per passenger, per mile, cents.....	3.560	3.631	3.888	4.134	3.407	3.646	4.964
83	Earnings per ton of freight per mile, cents.....	2.037	2.676	2.014	2.605	5.504	3.419	18.064
Operating Expenses—								
84	Operating expenses, passenger.....	\$522,715 21	\$86,971 91	\$465,966.38	\$219,376.41	\$8,745.96	\$12,615.39	\$7,401.87
85	Operating expenses, freight.....	1,056,774 43	149,399.07	569,022.57	304,170.56	7,436.15	21,814.74	5,308.46
86	Total operating expenses.....	1,579,489 63	236,369.98	1,034,988.95	523,546.97	16,182.11	34,430.07	12,710.33
87	Operating expenses per mile of road.....	8,537 78	2,142.63	3,994.55	4,280.24	935.38	1,026.94	1,210.61
88	Operating expenses per train mile, passenger.....	143.184	125.844	128.530	130.220	147.2707	148.7385	96.6861
89	Cost of Passenger and Freight Service—							
90	Cost per car mile in passenger-train, cents.....	27.36	31.51	29.06	36.78	28.2702	25.4251	54.1035
91	Cost per gross ton per mile in passenger-train, exclusive of locomotive and tender, cents.....	1.22	1.86	1.22	1.68	1.40404	1.3164	2.7174



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CONDUCTED BY

S. WRIGHT DUNNING AND M. N. FORNEY.

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Editorial Announcements.

Addresses.—Business letters should be addressed and drafts made payable to THE RAILROAD GAZETTE. Communications for the attention of the Editors should be addressed EDITOR RAILROAD GAZETTE.

Contributions.—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies, the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

Advertisements.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

STUDYING THE COST OF TRANSPORTATION.

The Louisville & Nashville Company works a system of railroads which is important, to be sure, forming, as it does, the chief connection between the country on and north of the Ohio River and the Southern States from the Alleghenies on the east west to Cairo, consisting of 920 miles of railroad under one control, and of 738 worked directly by the company. Still there is not a very heavy traffic on any of the lines in the system, though two of them are the greatest carriers between the North and the South west of Washington. The company's stocks and bonds are little heard of in the market, and, considering the extent of the system, there are probably few roads which attract less attention from the general public outside of the States in which the lines are situated. Nevertheless, the annual report of the company is almost the first in importance published in this country—in one respect unquestionably the first—and for men engaged in working railroads it offers material for study hardly to be found elsewhere.

And it is chiefly to this class of men—those engaged in the operating departments of railroads and other students of transportation—that the report is interesting. It is not specially valuable to those who wish only to ascertain the actual financial condition of the company—its yearly obligations in the way of interest charges and rentals and the margin between them and the net earnings, and the other facts which enable one to judge of the value of the company's stocks and bonds; indeed, appearing as it does nearly fourteen months after the close of the year whose results it gives, the clearest financial statement would not make it answer this purpose very well. The condition of a corporation's, as of an individual's, affairs a year ago is not always a safe basis for a judgment of their present condition. The very thing that makes the report especially valuable to a student of transportation—its elaborate fullness and completeness—probably prevents its preparation early enough to permit it to be of the highest value as a financial guide.

The company is closely connected with the community which it serves, by which a large part of its capital was contributed. The report of the election of October, 1874, shows that nearly one-half of the stock voted—33,441 shares out of 69,979—was voted by the city of Louisville and counties in Kentucky and Tennessee on the lines of the road; and this, by the way, united with the other shares, and gave a unanimous vote for the board elected. This solidarity of interests, however, has not prevented prejudice toward the railroad company, and Louisville has of late

years given heavy subsidies to a new road which was chiefly recommended as a competing line. The Louisville & Nashville is in a strong position, with a light capital account, notwithstanding the fact that it traverses some pretty difficult country, and, compared with other Southern railroads, with a large traffic and income.

The summary of the annual report for the year ending with June, 1874, which we publish in another column, aims to present the leading facts concerning the company's property, capital, traffic, earnings and expenses; but that it fails to give an idea of the report as published may be inferred from the fact that this report contains 224 octavo pages, more than two thirds of which are covered with tables. Last year we tried to describe the contents of these tables, which are for the most part unlike those of any other report, and contain information which enables the investigator to form a clear and just opinion of the work done by the company. The first of these tables, which we publish, will illustrate this: to a railroad man it is (or ought to be) of extraordinary interest, giving as it does facts of prime importance which are usually inaccessible. But the table which follows this, "Operating Expenses," is perhaps more notable still. It gives the expenses under eighty-one heads, distributed between passenger and freight traffic, and detailed for each of the seven lines worked by the company, and summed up for the whole system. This takes a great many figures, but they are figures which mean something. Under "Maintenance of Roadway, Bridges and Buildings," for instance, there are the subdivisions, "Road Repairs," "Cross-ties," "Bridges and Buildings," and under each of these, several lower subdivisions, which for "Road Repairs" are: "Adjustment of track," "Ballast," "Ditching," "Culverts and cattle guards," "Extraordinary repairs" (slides, etc.), "Repairs of hand and dump cars," "Repairs of road tools," "Road watchmen," "General expense of road department." Here we may see that the repairs of road tools used in maintenance of way chargeable to freight traffic on the Nashville & Decatur Railroad during the year amounted to \$585.05, and so throughout.

But following this table, which gives the gross amounts of each of the separate items on each line worked, we have another which gives these expenses per mile of road and per train-mile. This enables us to compare the expenses of the different lines. For instance, one line shows us that the cost of joint fastenings per train-mile was 2.3679 cents on the main stem, 1.5406 on the Knoxville Branch, 0.2070 on the Bardstown Branch, 0.713 on the Richmond Branch, 2.3605 on the Memphis line, and 4.5438 cents on the Nashville & Decatur Division. Many of the items are given both per mile of road and per train mile.

Another peculiar and valuable table is that giving the terminal expenses in gross and per ton and per passenger at every station on the road. Sometime ago we called attention to the importance of these expenses, especially as affecting local freight, and to the fallaciousness of the assumption that terminal expenses per mile carried are inversely as the length of the haul, itself based on the false assumption that terminal expenses are the same per ton and per passenger at all stations. Now in this table we see that at one station the expense per ton forwarded and shipped from that station was \$4.06, at another \$3.84, while the expense was less than a cent at four stations. Evidently the maintenance of a station in the most economical way, where very little traffic is received or shipped, must cost a great deal for each ton and passenger received or shipped at the station, for which alone usually the station is maintained. By the aid of another table, which gives the tonnage-mileage of the freight received and shipped at each station, we may ascertain the actual terminal expense per ton-mile for each station.

The General Superintendent's report includes no less than forty-five tables, of which we have described three or four.

But the special feature of this report, distinguishing it from the previous reports of the same company, is the text of the report of the Vice-President and General Superintendent, Mr. Albert Fink. A very few pages of this are given to the discussion of the results of the year and a comparison with those of the preceding years; but in connection with a statement of the constant and rapid decrease in the receipt and expense per ton and per passenger per mile there is given a discussion of the elements of the costs of transportation and an examination of the facts which govern the establishment and fluctuation of rates, illustrated throughout by the experience of this company, thus minutely recorded for a long series of years, with several railroads of widely different characteristics.

This discussion seems to us one of the most valuable contributions ever made to what we may call the economics of transportation, and we are glad to know that it will be made accessible to all interested in the matter; for Mr. Fink has copyrighted it and had it printed separately, and copies are offered for sale. This discussion covers forty pages of the report, and is given under the heads of "Percentage of Net to Gross Earnings no Criterion of Economy," "How Railroad Accounts Should be Kept,"

"Classification of Operating Expenses," "Causes of Differences in Cost of Transportation," "Comparison between Railroad and Other Transportation," "Governmental Regulation of Railroad Tariffs," "Principles upon which Railroad Tariffs must be Constructed," "Just and Unjust Discrimination," "Governmental Railroad Tariffs a Failure," and "Prevention of Extortion and Unjust Discrimination."

We need not call attention to the importance of these subjects, especially in these days of small profits and Governmental interference with rates. And to those who have seen Mr. Fink's previous work on the elements of the cost of passenger traffic (large extracts from which we have published, but the whole of which has not been accessible to most railroad men, we believe), no testimony will be needed as to the thoroughness with which the work is done.

Mr. Fink has a firm hold of his subject. The necessary principles which may be reached by deductive reasoning he is always able to illustrate by facts of experience which his records for fifteen years supply him in abundance, and with which his service in the active management of a system of lines for many years has made him perfectly familiar. This constant illustration of the principles stated by indubitable recorded facts makes the discussion most convincing. Indeed, the conclusions cannot usually be escaped, and are evident to any reader who glances at the facts presented.

To expose the fallaciousness of the percentage of working expenses to income as a criterion of economy, for instance, Mr. Fink cites the facts that while in 1865-66 the percentage of expenses of his road was 56.7 and in 1873-74 66.9, the expenses for equal amounts done was much the smallest in the latter year: in 1865-66 the expense was 3.04 cents per ton per mile; in 1873-74 only 1.41 cents. The proportion of expenses was nearly a fifth greater in the latter year; the amount of expenses less than half as much. But this fallacy, which is so generally accepted as truth, especially in Europe, is disposed of by facts which make it necessary also to show that neither is the absolute cost per unit of traffic a criterion of economy. The work done in 1865 at a cost of 3.04 cents was directed by the same management, by similar appliances, and with the same effort at economy as was that done in 1873 for 1.41 cents. This brings us at once to the discussion of the elements of the necessary cost of transportation, and the circumstances which make them vary, and the methods in which and the extent to which the different circumstances act. In the course of this discussion the distribution of maintenance expenses is considered, and it is shown that the actual expenditures on this account may not be and usually are not in proportion to the depreciation which occurred during that year, and this not simply in cases where a road is starved temporarily and knowingly suffered to depreciate in condition, but also when repairs and renewals are made as fast as they are needed. For instance, if a road is built with a large number of wooden bridges, while the expenditures for maintenance of bridges may not vary greatly for several years, when the timber begins to decay the entire renewal of these structures must be undertaken within a few years, and of course the expenditure for maintenance is greatly increased.

Mr. Fink says:

"If the percentage of operating expenses to income, or the cost of one ton of freight or one passenger transported one mile, cannot be used as an absolute measure of economy, or even as a measure of comparison—and we have seen that it cannot—the question arises, What is the proper course to pursue in ascertaining whether a railroad is economically operated or not?"

"To this the answer must be given that the only mode of ascertaining this fact thoroughly is to make an examination of each item of expenditure incurred in the operation of a railroad, and see whether this has been reduced to a minimum and the service rendered for it to a maximum. To make this investigation requires, of course, a thorough and practical knowledge of railroad operations, of the cost of material and labor, of the quality of the same, and of the best results that can be obtained therefrom. But even that knowledge would be of little avail unless the accounts of the operating expenditures of railroads are kept in such a manner as to exhibit in detail not only the expenditures, but also the amount of work performed for each item of expenditures."

Throughout the long discussion which has followed the restrictive legislation of Northwestern States for some years past, if there has been one thing more astonishing than the ignorance and presumption of the politicians who have formed legal tariffs, it has been the ignorance of railroad men themselves as to the elements which govern the cost of the service for which State legislatures were attempting to fix the remuneration. Most of them have known very well that they needed all they earned, and that the varying rates complained of they were in a manner forced to make; but in those rare instances where legislative bodies sought the evidence of railroad officers, their testimony has often been so vague and in many cases so erroneous that we wonder less at the audacity of ignorant legislators in assuming a task beyond the powers of any but the most thoroughly informed expert: they were wrong in concluding that the tariffs were all based on guesswork; but it was true that there was a great deal of guess-work about them. Perhaps demagogues would not have modified their action had the clearest proof been presented to them; but if the railroad companies could present the facts fully and clearly, the public would a

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Fig. 1.

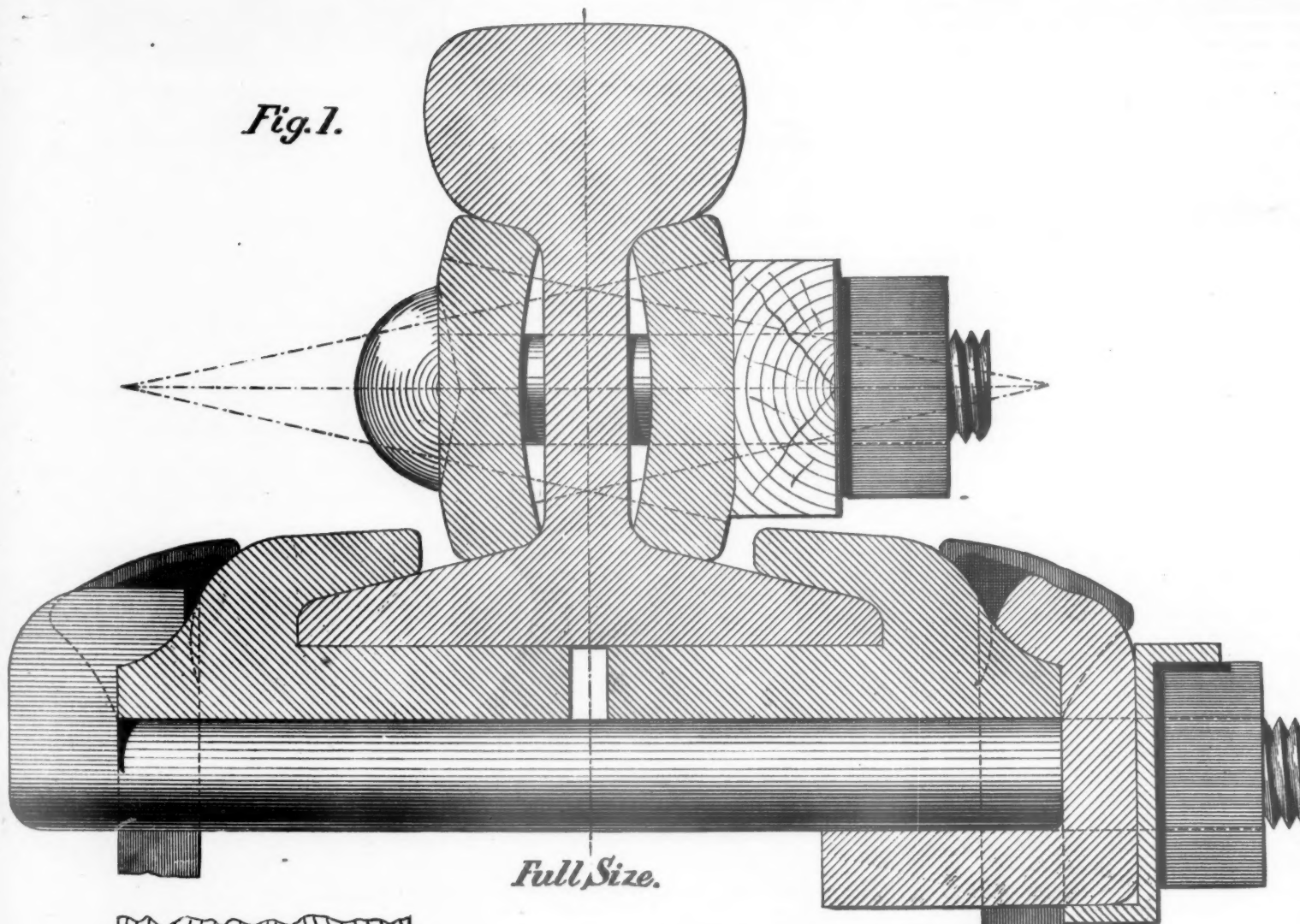
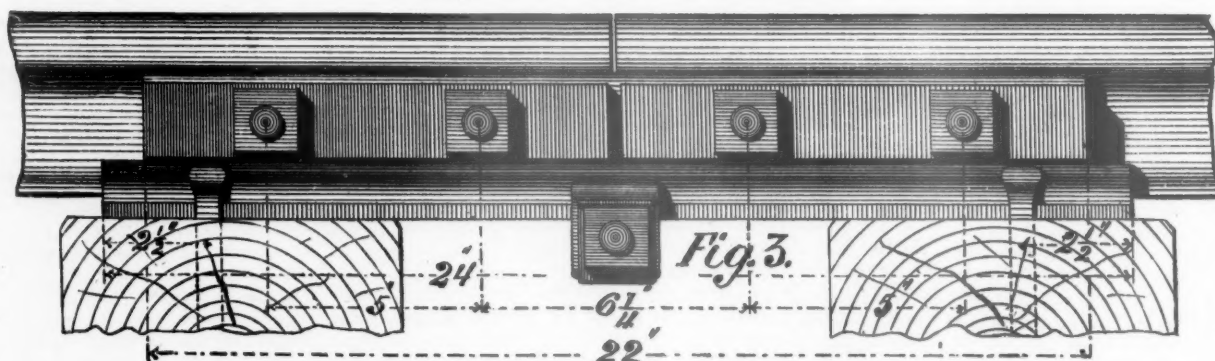
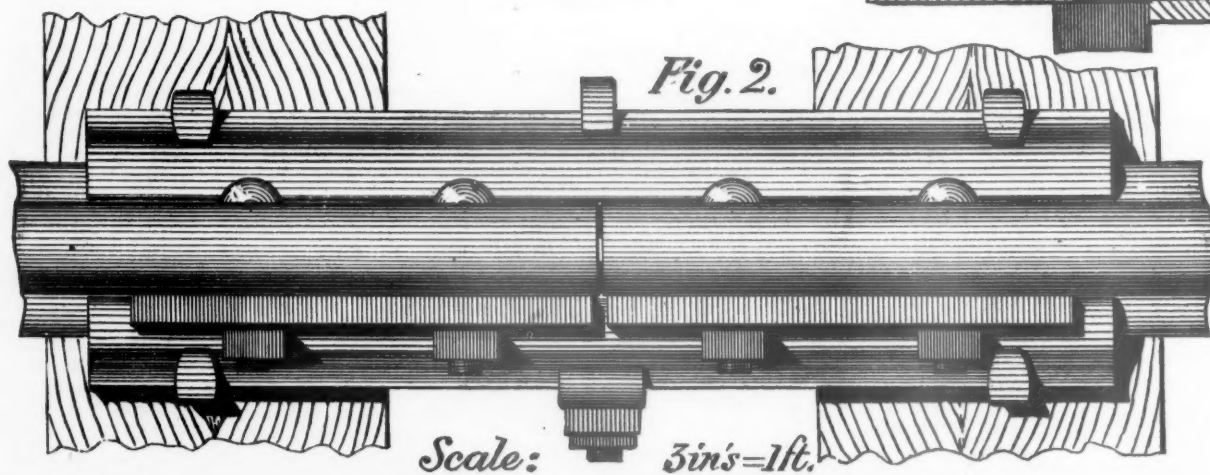


Fig. 2.



JOINT FOR STEEL RAIL.

Adopted by the Atlantic & Great Western Railway.

last be convinced, and the demagogues would have no motive for hostile action.

Aside from the importance of a definite knowledge of the elements of the cost of transportation, in connection with the relations of the railroads to the community, such knowledge is indispensable to the economical working of the railroads themselves. There is probably no railroad which has not been offered additions to its traffic on condition of taking it at exceptionally low rates. Here at once the question comes up: How much will such an addition to its traffic cost the road? If this question cannot be answered, then there can be no intelligent action in accepting or refusing the traffic. Doubtless a great deal of traffic is accepted on some lines which is carried at a considerable loss—a loss which falls upon the other customers of the railroad or the company itself; while in other cases, business is refused which would add somewhat to the profits of the carrier and largely perhaps to the resources of the community.

Such accounts as those kept and published by the Louisville & Nashville Company put solid ground under the feet of a manager endeavoring to work his road to the best advantage. He knows where his money goes, what and how much he gets for it, and the quantity of effort required to produce a given result. As to methods of keeping the accounts, or even of presenting some of them, there will doubtless be differences of opinion; but as to the importance of recording in some way, easily accessible and intelligible the results of working a railroad so as to present the elements of the cost of the work done, there should be no difference. Mr. Fink's report serves as a guide as to what these elements are, the circumstances under which they vary, and the accounts which it is necessary to keep in order to exhibit them.

A Summer Excursion.

In addition to the many attractions which the old Boston held out to attract strangers may now be added the architecture of the buildings erected during the past five or six years. The great fire of course gave to architects a wide field in which to exercise their skill and taste, and it may now, we think, be safely asserted that there is no section of any city in this country the buildings of which are equal in beauty of design to those which have sprung up in that section of the city destroyed by the fire, and also in the new portion which is now encroaching and extending on the area of the "Back Bay" land. It would lead us too far to discuss the causes of this apparently sudden development of artistic feeling and taste, but its existence indicates not only that the architects of Boston have the skill to design what is beautiful, but that the men of wealth who have erected these buildings have the taste to select such designs. The new buildings to which we refer, therefore, indicate a much more general diffusion of æsthetic culture in Boston than in any other city we can boast of. The agreeable part, looking at it from a professional view, is that as much taste has been displayed by at least one of the railroad companies as by any other individuals or corporations. The Boston & Providence depot is by far the most beautiful, convenient and comfortable depot building to be found in this country. We have all come to regard a depot as a dismal, uncomfortable place, which long habit has led us to regard as incapable of being made cheerful and attractive. When, therefore, we find a building provided for the public which is in itself "a thing of beauty," and every detail of which is so tastefully designed that merely looking at it gives us pleasure, we somehow look upon the world as much fitter for human habitation than we thought it before. In the *Railroad Gazette* of June 19 we published an engraving of this building, but, unfortunately, it was a poor one and by no means did the building justice. We have already published descriptions of it, so that we will not attempt to go into details now, excepting to comment upon the care and forethought which were evidently exercised on the plans before they were adopted. One of the great difficulties which must be encountered when a great corporation has any work of this kind to do is to procure and select a really good design. Perhaps no more inefficient method could be selected for arriving at any wise conclusions regarding matters involving æsthetic or scientific questions than that of counting noses, or, in other words, taking the vote of a body of men like a board of directors, who have no special training or knowledge of such matters. Quite wisely, therefore, the managers of the Boston & Providence Railroad determined to go to a number of the ablest architects and ask them to furnish designs for their new depot, and agreed to pay each of them \$500 for their designs, whether they were accepted or not. Five of the best architects in Boston were selected and invited to furnish designs, which they all did, and from these a selection was made. The result was that the railroad company procured the best information which such architects could furnish to aid them in determining upon a design. If the whole matter had been opened to competition in all probability the ablest architects would have declined to offer designs; but with the certainty of being paid for their labor and the additional chance of having their design adopted for so important a building, these parties quite naturally would do all in their power to devise the best plans they could. It is probable, therefore, that the \$2,500 expended for this purpose was the most profitable investment ever made by the company, and if we compare the Boston & Providence depot with that of the Lowell Railroad, we can see what zeal without knowledge will lead to in such cases. We are not able to give the cost of these two buildings, but it is certain that each cost considerably more than half a million dollars—report says between \$700,000 and \$800,000. The Boston & Providence depot, in the

RAILROAD EARNINGS IN JULY.

Name of Road.	Mileage.					Earnings.					Earnings per Mile.	
	1875.	1874.	Inc.	Dec.	Per c.	1875.	1874.	Increase.	Decrease.	Per c.	1875.	1874.
Central Pacific.....	1,315	1,260	55	.....	4.4	\$1,477,000	\$1,286,939	\$190,061	.....	14.8	\$1,123	\$1,021
Chicago, Milwaukee & St. Paul.....	1,399	1,399	.....	.....	.....	842,197	749,215	92,982	.....	12.4	602	536
Cincinnati, Lafayette & Chicago.....	75	75	.....	.....	.....	34,135	35,126	.....	991	2.8	455	468
Illinois Central.....	1,109	1,109	.....	.....	.....	702,784	627,454	75,330	.....	12.0	634	566
Indianapolis & St. Louis.....	265	265	.....	.....	.....	109,488	145,811	.....	36,323	24.9	413	550
International & Great Northern.....	458	458	.....	.....	.....	71,632	70,495	1,137	.....	1.6	156	154
Kansas Pacific.....	761	761	.....	.....	.....	282,686	293,247	.....	10,561	3.6	371	385
Keokuk & Des Moines.....	161	161	.....	.....	.....	60,439	41,248	19,191	.....	46.5	375	256
Missouri, Kansas & Texas.....	786	786	.....	.....	.....	214,719	245,650	.....	30,931	12.6	273	313
New Jersey & New York.....	37	22	15	.....	68.2	20,052	13,222	6,760	.....	50.8	542	604
St. Louis, Alt. & T. H., Belleville Line.....	71	71	.....	.....	.....	35,643	42,794	.....	7,151	16.7	502	608
St. Louis, Iron Mountain & Southern.....	685	685	.....	.....	.....	233,178	235,248	.....	2,070	0.9	340	343
St. Louis & Southeastern.....	349	349	.....	.....	.....	67,145	92,820	.....	25,675	27.7	192	256
St. Paul & Sioux City and Sioux C. & St. P.....	246	246	.....	.....	.....	81,110	68,128	12,982	.....	19.1	330	277
Toledo, Peoria & Warsaw.....	237	237	.....	.....	.....	116,980	78,837	38,143	.....	48.4	404	333
Union Pacific.....	1,032	1,032	.....	.....	.....	1,034,653	850,143	184,510	.....	21.7	1,003	824
Totals.....	8,986	8,916	70	.....	0.8	\$5,383,841	\$4,876,447	\$507,394	.....	10.4	\$509	\$547
Total increase.....	.....	.....	.....	.....	.....	.....	.....	507,394	.....	.....	.....	.....

RAILROAD EARNINGS, SEVEN MONTHS ENDING JULY 31.

Name of Road.	Mileage.					Earnings.					Earnings per mile.				
	1875.	1874.	In.	Dec.	Per c.	1875.	1874.	Increase.	Decrease.	P. c.	1875.	1874.	In.	Dec.	P. c.
Central Pacific.....	1,300	1,260	40	.....	3.2	\$9,324,000	\$7,610,903	\$1,713,097	.....	22.5	\$7,172	\$6,040	\$1,132	.....	18.7
Cincinnati, Lafayette & Chicago.....	75	75	.....	.....	.....	217,880	253,408	.....	\$35,528	14.0	2,905	3,379	.....	.....	\$474
Illinois Central.....	1,109	1,109	.....	.....	.....	4,070,071	4,191,309	.....	121,238	2.9	3,670	3,779	.....	.....	109
Indianapolis & St. Louis.....	265	265	.....	.....	.....	864,574	927,317	.....	62,743	6.8	3,263	3,499	.....	.....	236
International & Great Northern.....	458	410	48	.....	11.7	651,818	641,735	10,083	.....	1.6	1,423	1,570	.....	.....	147
Kansas Pacific.....	761	761	.....	.....	.....	1,732,973	1,812,928	.....	79,955	4.4	2,277	2,382	.....	.....	105
Keokuk & Des Moines.....	161	161	.....	.....	.....	464,325	369,025	95,300	.....	25.8	2,884	2,132	.....	.....	44.8
Missouri, Kansas & Texas.....	786	786	.....	.....	.....	1,452,744	1,676,596	.....	223,792	13.3	1,848	2,132	.....	.....	284
St. Louis, Alt. & T. H., Belleville line.....	71	71	.....	.....	.....	312,743	288,483	24,260	.....	8.4	4,405	4,013	.....	.....	942
St. Louis, Iron Mt. & Southern.....	685	684	1	.....	0.1	1,858,389	205,631	.....	12.4	2.713	2,413	300	.....	.....	12.4
St. Louis & Southeastern.....	349	349	.....	.....	.....	546,410	691,570	.....	145,160	21.0	1,566	1,982	.....	.....	416
St. Paul & Sioux City and Sioux City and St. Paul.....	246	246	.....	.....	.....	389,480	441,557	.....	58,077	13.2	1,550	1,795	.....	.....	296
Toledo, Peoria & Warsaw.....	233	237	.....	4	1.7	639,927	628,281	11,646	.....	1.8	2,746	2,651	.....	.....	3.6
Union Pacific.....	1,032	1,032	.....	.....	.....	6,560,427	5,413,776	1,146,652	.....	21.2	6,367	5,246	1,111	.....	21.2
Totals.....	7,531	7,446	85	.....	1.1	29,079,761	26,598,585	\$2,481,176	.....	9.3	\$3,801	\$3,572	\$229	.....	8.1
Total increase.....	.....	.....	.....	.....	.....	.....	.....	2,481,176	.....	.....	.....	.....	.....	.....	.....

design of which the managers of the road were not ashamed to ask for information of those who know the most about such things, is a building which is a constant source of pleasure to look at, and furnishes every convenience needed. The Lowell depot, on the other hand, is arranged in the most blundering way, is inconvenient, and we doubt whether any living beings, excepting the architects, ever get any pleasure out of the contemplation of its incongruities. It is quite certain that the stockholders of the road do not. Our object in calling attention to this is to show that in the expenditure of the large sums of money which railroad companies are now putting into various architectural and engineering works, it pays to get advice and information from the ablest experts, in order to avoid making very serious blunders.

The shops of the Boston and Providence Railroad are at the south end of Boston in what was formerly Roxbury. Since we were last there a new station called Chickering has been located very near the shops. The name is from that of the celebrated piano-makers, whose manufactory is quite near the station. The latter partakes of the large depot in its neatness of design and convenience.

The shops are presided over by Mr. George Richards, the Master Mechanic. The road was formerly equipped exclusively with inside cylinder engines, of which the venerable Mr. Griggs, Mr. Richards' predecessor, was, we believe, the last advocate in this country—at least the last advocate who put his ideas into practice. Since his death all the engines bought have been of the more modern outside-cylinder pattern. Like nearly all master mechanics, Mr. Richards has had his attention drawn to the question of wheels. He gives a very favorable report of the working of some "Bochum" steel wheels which he has put into use. We saw two pairs of these which had run 58,000 miles without turning, and they were apparently as good as when first put under the tender. He is also using solid-end coupling rods on his engines with very great success. These are made of the English pattern, and are put on with two brasses and a key.

Mr. Richards is a strong advocate of the Master Car Builders' standard axle, and is now putting it under all his cars whenever any old axles are replaced or new cars built. His verdict is, that it is beyond peradventure cheaper in every way than it would be to run a smaller axle.

He showed us a device which he has recently used on car and tender wheels which looks as if it might be useful. As all who have had experience know, one of the great sources of wear of car axles is from the dirt which is thrown on the back of the boxes. This dirt works into the box in spite of the dustguards used there to keep it out. On the principle that prevention is better than cure, Mr. Richards has had a ring cast on the outside of the wheels, which projects beyond the wheel and over the box, so that the dirt thrown from the wheel by the centrifugal force is received on this ring instead of on the box. Although the device is exceedingly simple, we doubt whether our description will make it clear; therefore we will ask the reader to imagine a ring 14 in. in diameter and 3½ in. wide resembling the rim of an ordinary belt pulley. This ring is, as stated, cast on the outside of the wheel and projects beyond and protects the inner end of the box as we have explained. Whether any practical advantage will result from its use only experience will show.

A great deal of trouble has been experienced on this as well as on most other roads from the breaking down of the draw-heads on dump cars. These are usually attached to a long piece of timber which projects beyond the car, and is without

sufficient support. The consequence quite naturally is that the timber or the draw-head, or both, are frequently broken down. Now for this timber Mr. Richards has substituted two 6-in. "channel bars," which extend the whole length of the car, and to which the draw-heads are then attached. We could not explain the method of attachment so as to be understood without an engraving, but the channel bars make it possible to bring the centers of the draw-heads to the standard height from the top of the rail, which it is difficult to do when attached in the ordinary manner.

Mr. Richards also showed us a very neat device for truing up emery wheels, which is usually done with a diamond tool. He uses instead a steel cylinder 2 in. in diameter and 1½ in. long, with a screw having five threads to an inch cut on its periphery. This screw is held on a spindle between the two prongs of a fork resembling the letter Y made of the size of ordinary tool steel, so that the stem can be put into the ordinary tool-post of a lathe. The emery wheel is then put between the centers of the latter and run at a high speed; the steel screw—which is hardened—is then brought in contact with the face of the emery wheel. This causes the former to revolve, and as the screw turns the thread advances so that it comes in contact with the whole face of the wheel. This device originated no one knows where, but was suggested to "one of the men" by "another man."

The shops of the Boston & Albany Railroad, as most railroad men who visit Boston know, are almost in the center of the city. Mr. A. B. Underhill has the management of them. Our visit there was quite brief, and as we described these shops once before there is not very much to say about them now. A new stationary engine, built by Mr. Wheelock, of Worcester, is an excellent piece of workmanship, and, as we believe, the smoothest and most silent-working machine we ever saw. On the turn-table in the engine house we saw what was a novelty to us in the form of an indicator in the center of the table, so that in running an engine in the runner can tell when the engine is in the position in which it will be balanced. The indicator consisted simply of a stand about the center of the table with a number of pegs in it which serve as marks to which the runner sights the position of the engine when he gets near the middle.

We have heretofore referred to the library of the Boston & Albany Railroad. This is intended for the use of the employees along the line of the road, and has been in very successful circulation, we suppose we should say. It consists of more than a thousand volumes, which are sent to any of the employees at any station on the road, who order them through the station agents. Besides the ordinary rules of circulating libraries, the following will indicate the special regulations which are found necessary for what might be called a peripatetic library:

"Any one known to the Librarian to be in the service of the Boston & Albany Railroad Company may call when the Library is open or send for books in accordance with its rules.

"Those who cannot call will order through the station agent, or head of department, and the person ordering will be held answerable to the Librarian for the safe return of the books.

"All persons out of Boston will pack their books in strong paper, and direct to 'Librarian, Boston & Albany Railroad Library, Boston,' writing plainly from whom, and name of station, and, as far as practicable, will send them on Tuesday of each week. Orders for books shall be answered on Thursday or Friday of each week.

"Books in transit, either way, shall not be at the risk of the person sending or receiving them, when forwarded in the care of a regular baggage master.

"If any one has books, or other property of the Library, when leaving the service of the company, the value of the same shall be deducted from his wages."

The car shops are at Allston, which is a few miles from Bos-

ton, and, as most of our readers know, are under the charge of Mr. W. E. Chamberlain. He has just completed the fourth postal car, which has all the latest improvements and devices for facilitating the assortment and distribution of the mails. He is also building 50 box cars with the Master Car-Builders' standard axle, box and jaw. There are also in progress eight scale coal dump cars. These are intended for supplying locomotive tenders with coal and are arranged with a set of scales on each car, so that the coal is actually weighed before it is delivered to the tender. There is thus no chance for dispute about the quantity delivered. The cars are arranged on a suitable track running to the coal bins, which are elevated so that the car can be run from the bins and dumped directly into the tender. We believe that the Boston & Albany Company purposes now to keep account of all the coal consumed by its engines. We will venture to recommend that they keep it in such a way that it will show the amount of coal consumed per car per mile as well as per train per mile. It is absolutely necessary to know the cost per car per mile to form any idea of the economy with which engines are working.

Mr. Chamberlain has also just completed a wrecking derrick car, and is rebuilding several passenger and baggage cars. His shops are equipped with the best tools, and evidently work is done at a very low cost. His system of accounts is one of the most complete we have found in any shop, but it would lead us too far to describe it here.

The shops of the Old Colony Railroad are also situated in the city of Boston, or more properly in South Boston. Mr. J. K. Taylor is Master Mechanic. He, too, is preparing to keep account of fuel consumed. Many of the engines of this road have been built in the shops of the company, and are excellent specimens of workmanship. We found very little that was new to report, but everything seemed to be moving along very smoothly.

Mr. Taylor was using a feed-water heater on his stationary engines, of which he speaks very highly, but we could not describe it clearly without an engraving. It is the invention of Mr. M. W. Hazleton, of South Boston.

The shops of the Lowell, the Fitchburg and of the Boston & Maine roads are all located in the northwestern part of Boston, and all have a sort of amphibious character and are either built over water or are surrounded by it. Mr. J. F. Crockett is Master Mechanic of the Lowell road, Mr. Geo. A. Coolidge of the Fitchburg, and Mr. F. A. Waite of the Boston & Maine. None of these gentlemen are doing more than keeping their engines in repair. On the Lowell road Mr. Crockett has been experimenting with a smoke-stack for carrying the sparks back into the fire-box. On the Fitchburg road Mr. Coolidge is using Hawkes & Paine's arrangement for doing the same thing. His report of its operation is very favorable. Unfortunately the patentees of several of these devices are engaged in litigation, and therefore whatever merit there is in them must slumber until they can establish their respective rights. Mr. Waite is using the Magoon heater on several engines, and reports very favorably of its operation. It is thus described in a circular issued by the patentees:

"An insulated steam-chamber is constructed around the stack of the engine, and within this chamber a section of the feed-water pipe is coiled, forming a helix through which the water passes on its way from the pump to the boiler. The exhaust is divided, a branch pipe being employed to conduct a part of the steam into the chamber for heating the feed-water, while the main exhaust discharges up the smoke-pipe to promote the draught of the engine in the usual manner. A small eduction-pipe is provided near the top of the chamber, through which the surplus or waste steam passes, and there is also a drip-pipe near the bottom of the chamber for carrying off the water of condensation. The stack is formed with a joint below the bonnet to afford easy access to the top of the heater, there being also another joint at the bottom of the chamber."

The inventors claim a saving of from 20 to 35 per cent. of the fuel, which is entirely too much. A much smaller economy would make the heater profitable.

We visited the car shops of the Fitchburg road, and found the same condition of things existing there as everywhere else. Mr. Varney, the Master Car-Builders, is building several new passenger cars, which he is fitting up very neatly. While engaged with him in examining one of his cars, a sudden dull report, as though some heavy weight had fallen down in the shop, attracted our attention. Noticing that some of the men were running from the shop, we followed, and soon learned that a locomotive standing about 400 feet from the shop had exploded. We found it was a small four-wheeled switching engine, built by McKay & Aldus, who formerly did business in East Boston. The whole shell of the boiler between the fire-box and smoke-box was completely torn to pieces. The rents, as far as we could examine them, went apparently without any reference to the seams or solid plates, and were in some cases through the latter and again through the rivet holes, or along the caulking edges of the seams. The longitudinal braces or stays which extended from the front tube plate to the back end of the fire-box shell were left almost uninjured. The tubes were spread apart after the explosion in the usual manner, some being torn out of the tube sheets. The New York *Tribune* of the next day contained the following excellent description of the explosion:

"Freight engine No. 1, standing in the Fitchburg Railroad freight yard at Charlestown, blew up this afternoon with terrific violence. The engineer and fireman were blown to the top of a car in rear of the tender, but strangely escaped serious injury. A switchman who was on the engine was, however, horribly scalded. The switchman may possibly recover. The engine was thought to be in the best of order, and the cause of the explosion is not known. The violence of the explosion was so great as to blow a fragment weighing 200 pounds through the wall of the freight-house, twenty feet distant. The men working inside escaped injury. Rails were torn from the track beside the engine and bent as though made of lead. One rail was carried fifteen feet and forced through the wall of the freight depot. On the track beside the engine was a train of freight cars. One standing opposite the locomotive was made a complete wreck. One piece of the boiler, weighing 32 pounds, was blown into the air, and fell nearly a quarter of a mile from the scene of the explosion, passing through the roof of the St. John's Episcopal Church, on the cor-

ner of Bow and Richmond streets. The fragment fell into the main aisle, within three feet of where a woman was engaged in washing the floor. A portion of the bell of the engine, weighing ten pounds, struck the roof of a house on Union street, an eighth of a mile distant, passing through two thicknesses of board. The tongue of the bell, weighing ten pounds, struck the roof of house No. 16 Richmond street, near St. John's Church, and passed through to the second story hall, and fell at the feet of Mrs. S. Kelton and her two children. A gentleman passing along Bow street, a quarter of a mile distant, was struck on the hand by a fragment of the boiler and severely cut. The chimney of the "L" of a house in the rear of St. John's Church was demolished by a falling fragment of the boiler, and several houses in the vicinity were more or less injured by flying pieces. Pieces of the hot iron fell in the streets in the immediate vicinity of groups of children who were at play, yet, so far as heard from, none were on the list of injured.

A large crowd collected immediately after, so that there was no opportunity of examining the boiler carefully, but the engine was one which was built just about the close of the war, at the time when it was impossible to get good boiler plate, which fact, taken in connection with the appearance of the iron after the explosion, would lead us, if we were a jury, to bring in a verdict of "bad iron," as the cause of the explosion.

From Boston we went to Worcester, when we had an opportunity of seeing the new depot building of the Boston & Albany Railroad. As we expect to give an engraving of this soon, we will not give a description of it now, excepting to say that it will rank with the best buildings of this kind in the country. We called on Mr. Griggs, of the Worcester & Nashua road, and found that he also was using a device of his own invention for burning sparks, which he carries back to the fire-box. He was just on the eve of going to Providence, so that there was little time to go through his shops.

From Worcester we went to Hartford and saw both Mr. Garfield and Mr. Perry, of the Hartford, Providence & Fishkill road, but had not time to go through their shops. We visited the Washburn Steel Wheel Works, which are situated in Hartford. These wheels are made with a steel tire welded on a cast-iron center. This is done by first heating the tires in a heating furnace to a high temperature, and then placing them in the mould or flask and closing it up and then pouring the molten cast iron in to form the center of the wheel. The cast iron then unites with the steel so as to form a perfect weld. The reports of the use of these wheels on different roads vary so much that it is difficult to form any accurate opinion of their value. Mr. Chamberlain, of the Boston & Albany road, as our readers know, has reported very favorably of them, whereas in other places the experience of those who have used them is not so favorable. Very great improvements have been made in their manufacture since they were first introduced, so that doubtless those made now are more reliable than others which were first produced were. The establishment is now turning out 26 wheels per day.

The Messrs. Howard, manufacturers of car trimmings and fittings, reported that they found it necessary to run 12 hours per day to fill orders, which are principally for passenger cars, which are being built for Centennial business next year.

On our way to New York, we stayed over at New Haven for several hours, and saw Mr. Kittendorf and Mr. Denver of the New Haven roads. Mr. Kittendorf is using on his locomotives the extended smoke-box, the name of the patentee of which has escaped us. The smoke box is extended forward to about twice the ordinary length and has suitable deflectors and wire netting inside to arrest the sparks. With it he is able to use a straight open smoke-stack and incur no danger, and very little annoyance from sparks. He is also using the "Bristol" roller valve with perhaps doubtful economy.

Mr. Denver has just completed several new passenger cars, which are very well finished, but with, perhaps, a little too much exuberance of color and ornament for good taste; but then the public like it, and it is the public which railroad companies must or should aim to please, so that as things are, perhaps "what is, is right." In many of the little details Mr. Denver has shown the instincts of a good mechanic. Passengers will thank him for making the ledge for the arm-rest next the window wider than usual. This he has done by putting the window frame as far out on the posts as possible, and dispensing entirely with the vertical piece at the window sill, and using instead for protection against rain and dust an ordinary rubber weather strip.

The new depot of the New York, New Haven & Hartford road is a delightful contrast to the old, dark, underground black hole into which passengers were thrust in former times. The new one is located nearly a mile west of the old one and near the shops. It has a pleasant outlook on the water, and in summer is delightfully cool. The building is built of brick, two stories high, with a Mansard roof, and has very comfortable waiting rooms and restaurants, or, as we heard a New England man call it, a "pie room," which title must have had a vein of what Artemus Ward called "sarkasmus" in it. At each end of the building are long open sheds, covering the platform, so that with the longest trains passengers may still be under cover. From this depot we took what was unfortunately for us an accommodation train, which made the journey to New York extremely tedious. We arrived there in due time and—our Summer Excursion was ended.

Joint for Steel Rail.

Our full page engraving this week forms another of our series of illustrations of rail-joints in use in this country. The one represented has been adopted for the Atlantic & Great-western Railroad. It is so clearly represented in the engraving as not to require any description. Fig. 1 is a full-size section of the rail, and figs. 2 and 3 a plan and side elevation of the rail-joints and splice made to a scale of 3 in. = 1 foot. It will be noticed that the nuts on the fish-plate bolts are screwed down on a wooden bearing piece, with a wrought-iron washer under the nut. The wood has a sufficient amount of elasticity to prevent the nuts from unscrewing. The lower plates or

chairs are held together by the hook-head bolt shown very clearly in fig. 1. The other peculiarities of construction are shown very plainly in the engraving. This form of rail-joint is manufactured, we believe, by Dilworth, Porter & Co., of Pittsburgh.

THE ACREAGE OF CROPS IN ILLINOIS is reported in the assessments for 1874 and 1873 as follows:

	1874.	1873.
Wheat, acres.....	2,423,050	2,591,031
Corn, acres.....	7,797,251	7,389,334
Oats, acres.....	2,226,744	1,821,093
Other field crops.....	841,874	820,104
Total.....	13,288,919	12,611,562

The increase in the area of cultivated land in this comparatively thickly-peopled State is noticeable. In 1860, when the population was about 1,700,000, the area under the plow was reported at 7,109,000 acres. In 1865, at the close of the war, it was 7,633,000, the increase during this period of war having been but $7\frac{1}{2}$ per cent. But since 1865 the growth has been rapid. In 1870, when the population was about 2,500,000, the acreage in crops was 10,686,000, an increase of 40 per cent. over 1865 and of 50 per cent. since 1860, the latter increase being just about as great as the increase in population, though this increase of population was much greater in the towns than in the country, nearly a quarter of it being in Chicago alone. Since 1870 the increase has continued, and for 1874 the acreage is about 2,600,000, or 21 per cent. greater than in 1870. The total area of the State is 35,400,000 acres, so that little more than a third of it seems to be in crops even now; but it is true, nevertheless, that most of it is utilized; and the assessment of 1874 gives account of 14,740,000 such acres—7,104,000 in forest, 4,326,000 in pasture, 2,227,000 in meadow, and the rest in orchard. This accounts for four-fifths of the area of the State; and if we make allowance for the area under water or in swamps and otherwise actually uncultivable, there would seem to be little room left for a growth like that since the war.

Omitting the timber land, 57 per cent. of the total area of Illinois seems to have been in plow land, meadow or pasture in 1874. This is probably a larger proportion than in any other State; it is certainly a larger proportion than was shown for any other State by the census of 1870, when New York, which stood second, had 52 per cent. of its area employed for agriculture, and Ohio 50 per cent.

THE CHICAGO & NORTHWESTERN REPORT has been issued during the week, but we are able to present only a very brief abstract of it this week, hoping to give it more attention hereafter. A decreased traffic and lower tariffs have brought down the net earnings materially, as was inevitable, but most of this loss has been balanced by a reduction of working expenses. The year has been a most trying one for railroads in its situation, where the wheat crops and the price of wheat give the key to nearly all business, and where rates have been reduced by law even below what the necessities of the situation would have made them; but there is a promise of a radical change the coming year, the wheat crop on the lines being very large, and the demand for it good and assured. It may be that this and the other wheat roads may have as much the advantage of other Northwestern roads as they have been at a disadvantage for the year past.

OVERWORK OF ENGINEERS is complained of by Mr. P. M. Arthur in the last number of the *Locomotive Engineers' Journal*, who says that he was informed by the men running engines between Syracuse and Buffalo that they were from eighteen to twenty-two hours making a trip. If this statement is correct, Mr. Arthur's comment that it "is too long for any man to be on an engine, and he is unsafe when that number of hours on duty," is certainly a very mild way of calling attention to the evil. If men are kept on duty that length of time, it is probably because some subordinate officer finds it inconvenient to arrange things differently, but then that subordinate needs looking after. It is both inhuman and what the lawyers would call "criminally negligent" to keep men on duty so long unless under very pressing necessity, or as a very rare and unavoidable occurrence.

THE REPORT OF THE MASTER CAR-BUILDERS' ASSOCIATION for the last year is now published in book form, and copies are now ready for delivery to members of the Association. Persons who are not members can obtain copies at 75 cents each of Mr. C. A. Smith, the Secretary of the Association, whose address is No. 118 Liberty street, New York. Heretofore the report has not been for sale, but the new arrangement will enable a large class of men interested in the subject, including many railroad men and manufacturers, to take advantage of the good work done by the Association.

How the Metropolitan Railway is Worked.

PHILADELPHIA, August 24, 1875.

TO THE EDITOR OF THE RAILROAD GAZETTE.

In one of your issues in the early part of this year a desire was expressed to obtain some accurate information about the Metropolitan Railway in London, sometimes termed the Underground. Having just returned from that city, where I made some inquiries concerning it, the following brief account will be doubtless found interesting, inasmuch as the question of the day in New York is quick transit, while the Rapid Transit Commissioners may find acceptable the following figures about its working.

It is unnecessary to give in detail an account of the construction of the Metropolitan Railway, as the railroad and engineering journals at the time fully instructed all interested in it; but a short resume may not be out of place.

The Metropolitan Railway was commenced nearly twenty years ago, to give the Great Western Railway, having its terminus at Paddington, a city station at Farringdon street, about four miles to the east. It has since been extended further

eastward about a mile and a quarter to Bishopsgate, where it connects with the Great Eastern Railway, and from Paddington west by south to Kensington, where it connects with the Metropolitan District Railway (generally called the "District Railway"), also an underground line, which extends eastward, and of which more hereafter. These two railways form an irregular, almost complete ellipse, sixteen miles in length, of which each company possesses half.

The dimensions of tunnel are eighteen feet in height and twenty-five feet in breadth, and the maximum distance of track from surface sixty feet. Accurate figures as to proportion of tunnel to open cut were not obtainable, but I should estimate it in the proportion of 10 to 1. The gauge is 4 ft. 8½ in. The sharpest curve on main line has a radius of 627 feet and on siding 996 feet. The maximum gradient is 1 in 70. The rails are steel, 24 feet long, and weigh 86 pounds to the yard. Their average life at railway stations, where the friction is very great, is two and a half years, and at other places, eight years. They are laid in cast-iron chairs weighing 39 pounds each, which are screwed to pine cross-ties 6 ft. by 12 in. by 12 in. placed 2 ft. 8 in. apart, and their average life has been seven years. The ballast used is gravel, which does not cover the cross-ties.

The weight of locomotives is 42½ tons (of 2,240 lbs). The engines have eight wheels, a rigid wheel base of 9 feet, and a total wheel base of 19 feet. The diameter of drivers is 5 ft. 9 in.; weight on driving wheels, 32 tons. The cylinders are 17 in. by 24 in., and the boiler pressure is kept at 130 lbs. The fuel used is a medium hard, smokeless coal from South Wales, called Bwiffa coal, and the amount consumed is about 32 pounds per mile. Coke is also used. The speed maintained is 12 miles an hour, and the average mileage per engine is 130 miles per day.

The first-class cars are 40 feet long, 8 feet broad and 11 feet high. They are divided into six compartments, upholstered and decorated, each compartment containing seats for eight persons. They are mounted on two four-wheeled trucks, the diameter of wheels being 3 ft. 9 in. The car weighs, empty, 15 tons.

The second and third-class cars have the same dimensions and contain eight compartments, each seating ten persons. The only difference between the second and third class is that the former have their seats just covered with leather, while the latter are simply painted boards; they weigh, empty, 14 tons.

The trains are generally made up of six cars, viz.: One first-class, two second-class, three third-class. Sometimes there is an extra composite car of first and second-class compartments. Trains with six cars have a seating capacity for 448 persons, but at morning and evening, when the traffic is heaviest, it is no unusual sight to see people standing up between the seats, so that the number carried generally reaches 500.

Some smaller four-wheel cars of all classes have lately been put on the line, eight of which make a train.

Between Moorgate street, the station first after Bishopsgate, and King's Cross Station, a distance of nearly two miles, four tracks are laid, so that the cars of other railway companies having their termini adjacent to the Metropolitan Railway within that distance, and with which they connect by short branch lines, may find a central city station without impeding the running of the regular Metropolitan trains. The railway companies that have made use of this great desideratum are the Midland and Great Northern railways, whose trains enter at King's Cross; the London, Chatham & Dover, whose trains enter between Farringdon Street and Aldersgate Street Stations; the Great Western Railway, whose trains enter at Paddington; and the London & North-western, whose trains enter at Uxbridge road, a station on the District Railway, and run to its terminus at the Mansion House. From Moorgate street or Mansion House a passenger can take tickets to any stations on the main lines of the railways whose trains start from those two stations.

By changing cars a passenger can get on the system of the Southeastern and Southwestern, North London and West London railways, so that the Metropolitan railways have acted the part of a mutual friend in bringing all the large railways centering in the city together, and have been a great boon to the traveling public.

In addition to these lines, which throw an immense amount of traffic over the Metropolitan, it has extensions or feeders of its own, such as the St. John's Wood Railway, 1¼ miles in length, and the Hammersmith & City Line, which last is a : entirely open road about 2½ miles long.

Summing up, we have the Metropolitan Railway, 8 miles in length; the District Railway, 8 miles in length, and the St. John's Wood Railway, 1¼ miles in length, a total of 17¼ miles, which is purely underground railway, and the ventilation of which has always been an uppermost consideration. Air shafts had been sunk where most practicable and required, and the stations were in open cuts, so that the circulation of air might be kept up. The engineer has recently placed deflectors in the air shafts, so that the passing train drawing its smoke after it would cause it to ascend and draw down after it the needed oxygen, but notwithstanding this, there is a sulphurous taste in the mouth for a short time after traveling on it.

Between Bishopsgate and Mansion House there are 22 stations. They are about half a mile apart from each other, and rarely exceed a mile. The round journey is accomplished in 55 minutes. The line is worked on the absolute block system of signals, so that no train can enter upon a section until it is telegraphed clear from the other end. Both points and signals are so connected at junctions or switches that derailments never take place, and accidents very seldom occur, and so far as I have been able to learn, there has been no loss of life from the company's negligence.

The first train arrives at Bishopsgate at 5:47 a. m., and the first train leaves at 5:50 a. m.; the last train is dispatched at 11:47 p. m., and the last train arrives at 12:35 a. m. Between those hours 195 trains are dispatched, and 196 trains received.

The greatest interval between two trains is 15 minutes, and the east 2 minutes, the average interval being 5½ minutes. The stops at stations are very brief—not more than a minute—yet in that short space of time passengers alight and get in and the train proceeds. There are signs hung over the platform telling the passenger where to wait for the class he has taken ticket for; all is so systematically arranged that there is no rush to find your class.

The following figures show the number of passengers carried during a series of years on the Metropolitan Railway—the north half of the ellipse. The largest number carried on any one day was last Whitmonday, May 17, 1875, when 260,000 passengers were transported:

Year.	Number of passengers.	Year.	Number of passengers.
1863.....	9,455,175	1869.....	36,893,791
1864.....	11,721,889	1870.....	39,160,849
1865.....	15,763,907	1871.....	42,765,427
1866.....	21,273,104	1872.....	44,392,440
1867.....	23,403,282	1873.....	43,533,973
1868.....	27,708,011	1874.....	44,118,225

During the first six months of 1875 the Metropolitan Railway carried 23,543,567 passengers, and in commenting on the report the Chairman, Sir Edward W. Watkin (now in this country as agent of the Erie bondholders), stated that in the last year they carried, on their eight miles of railway, 46 million passengers, whereas on the London & North-western, with 1,600 miles, they carried only 44 millions; the Great Western, with 1,532 miles, carried 34 millions; the Midland, with 1,114 miles, 26 millions; the Great Eastern, with 852 miles, carried 31 millions; the London & South-western, with 685 miles, 20 millions; the Great Northern, with 586 miles, 14 millions; the Brighton, with 345 miles, 24½ millions; the Southeastern, with 331 miles, 23 millions; the London, Chatham & Dover, with 157 miles, 20 millions; and the North London, with 12 miles, 19 millions.

In regard to rates of passage on the Metropolitan Railway, it would be incorrect to say that it is so much per mile; for instance, the fare from Bishopsgate to Mansion House, first class, is 24 cents, gold; second class, 18 cents, gold; third class, 12 cents, gold; but the rates to Victoria Station, between the two points, are the same. From Moorgate street to Gower street, the fare, third class, is 8 cents gold; distance, a little over two miles; while to Sloane-square Station, more than three times the distance, the fare is the same.

For annual tickets paid for at the time the rate of fare is about 50 per cent. less, and the holder can travel with one as many times a day between the two points for which it is issued as desired. Many people therefore avail themselves of these commutation tickets.

The cost of the Metropolitan Railway has been enormous, owing to its traversing valuable city property, the figure running up to over £800,000 per mile, which is equal to \$75, gold, per inch. The working expenses are 40 per cent. of the gross earnings. At the last semi-annual meeting a dividend at the rate of 3½ per cent. on the ordinary stock was declared, an increase of ½ per cent. over the dividend for previous half year, and the Chairman stated that he believed the line was capable, if the trains were longer and the stations were lengthened, of a development of at least 10 or 20 per cent. in the next two or three years.

As stated above, between King's Cross Station and Moorgate street there are four pairs of rails, and at the latter station they open out into six pairs to accommodate the trains starting from and running through that station, viz.: the Metropolitan use two pair, and run 391 trains over them daily; the London, Chatham & Dover use one pair, and run 139 trains daily over it; the Midland use one pair, and run 113 trains over it daily; the Great Northern Railway use one pair, and run 85 trains over it daily; the Great Western use those belonging to the Metropolitan, and run 121 trains over them daily, and there is one spare line for use in case of emergency. Here is a total of 849 trains handled during the day, and on holidays and special occasions the number generally reaches 1,000. In addition to these there are the trains dispatched from the junctions, and the freight trains that are passing from one railway to another, making use of the Metropolitan as the connecting line. The men who can thus manage and efficiently operate a short line with such an immense traffic without hitch or accident are truly wonderful, and Mr. Schwabe, who investigated the working of the road in 1870, may well say: "This running is unique of its kind, and it is necessary to have seen it to admit its possibility."

The District Railway with their double track work 466 trains per day between 5:30 a. m. and 12:35 midnight, at an average interval of 2½ minutes between each train. It is in many respects similar to the Metropolitan Railway, but all of its stations being in open cuts, and the ventilation being superior, it is called the "Daylight Route."

An amalgamation of the District Railway with the Metropolitan has been proposed, but the shareholders of the latter at the present time are unwilling to carry it out. The editorial in the *Railroad Gazette* of Aug. 7, on "The London City Railroads," pointed out so succinctly that what New York requires is cheap and quick transit, so that her population may increase at a larger rate than it has done during the last five years, that it is unnecessary for me to dilate upon it. It is well known that railroads draw population to them, and whether New York is to have an elevated or underground railway, either of which will be of great benefit to her, she cannot afford to be any longer without it.

HOWARD FLEMING.

The Swing-Beam Truck Patent.

The Locomotive Engine Safety Truck Company has for several years been engaged in litigation to establish the validity of the Alva F. Sweet patent of Feb. 11, 1862, for what is known as the "swing-beam truck" for locomotives, and has at last succeeded. Some important settlements for the use of the patent have lately been made with the company, one of them being with the Western Railroad Association, whose headquarters are at Chicago, which include the principal Western roads. Through this the company receives its royalty on several hundred locomotives.

General Railroad News.

ELECTIONS AND APPOINTMENTS.

Gilman, Clinton & Springfield.—The new board of directors appointed by the Circuit Court is as follows: John T. Stuart, Springfield, Ill.; S. Linn Beidler, Logan County, Ill.; Thos. Snell, John Weedman, John Randolph, DeWitt County, Ill.; Robert E. Guthrie, McLean County, Ill.; James M. Sudduth, Michael Sullivan, Ford County, Ill.; Elias Wenzler, Iroquois County, Ill.; Charles S. Seyton, England. These gentlemen are to act as directors until the election can be held, as provided for under the decree of the court. This board subsequently elected Colonel Thomas Snell, Clinton, Ill., President, Dr. E. Wenzler, Gilman, Ill., Vice-President, and S. L. Beidler, Mt. Pulaski, Ill., Secretary.

Corpus Christi, San Diego & Rio Grande.—This company was permanently organized at Corpus Christi, Tex., August 11, by the election of the following officers: U. Lott, President; Wm. L. Rogers, Vice-President; J. B. Mitchell, Secretary, and G. F. Evans, Treasurer.

Peoria & Springfield.—The annual meeting was held in Peoria, Ill., last week, and the following directors elected: Sidney Pulsifer, A. J. Hodges, R. G. Ingersoll, Peoria, Ill.; James Haines, A. J. Ware, D. T. Thompson, Pekin, Ill.; Luther Dearborn, Havana, Ill.; H. B. Rankin, Athens, Ill.; C. R. Griggs, New York. At a subsequent meeting of the directors James Haines was elected President; A. J. Ware, Vice-President; D. T. Thompson, Secretary; Sidney Pulsifer, Treasurer; B. S. Prettyman, Attorney; C. R. Griggs, Financial Agent.

Northern Transportation Company.—Mr. A. W. French, formerly Agent at Ogdensburg, has been appointed Receiver. Philo Chamberlain has been appointed General Manager of the line.

European & North American.—M. S. Drummond, Arad Thompson and Elias Merrill have been chosen the Bangor City directors for the ensuing year.

Manchester & Keene.—At a special meeting in Keene, N. H., August 16, the following officers were chosen: President, Theodore H. Wood, Nashua, N. H.; Clerk, Thomas E. Hatch, Keene, N. H.; Treasurer, Simon G. Griffin, Keene, N. H.

St. Louis & Toledo Air Line.—The first board of directors of this company, formed by the consolidation of the Toledo & St. Louis and the Shelbyville, Oconee & St. Louis companies, is as follows: Geo. D. Chaffee, Edward B. Stephenson, Isaac Porter, J. C. Silver, Geo. R. Wendling, D. W. Marks, Jonathan Patterson, S. B. Blackwell, A. W. Smith, Pannock R. Neptune, God. D. Herley, I. S. Gilliland, Thomas S. Sprague and Alfred Jameson.

Mexican Railway.—At the meeting of this company held in London on the 30th of June, the Directors whose term had expired were re-elected and the Board remains constituted as follows: Robert Wigram Crawford, Chairman; Thomas Callett Sanders, Deputy Chairman; William Barron, George W. Campbell, Antonio Escandon, David Fergusson, Henry H. Gibbs, Joseph H. Gibbs, Henry Goschen, Peter Penn-Gaskell. Directors appointed by the Government acting in Mexico are Miguel Anza, Augustin R. Gonzalez; acting in London, Juan N. Adorno, Ignacio de Ibarondo; The General Manager in Mexico is Thomas Braniff; Consulting Engineer, in London, W. Cross Buchanan; Engineer in Mexico, George Foot.

American Society of Civil Engineers.—The July Transactions announces the following new members: Robert Forsyth, Superintendent Bessemer Steel Works, Chicago, and D. Farrand Henry, Chief Engineer Detroit City Water Works, members; August J. Dubois, Sheffield Scientific School, New Haven; Geo. A. Kimball, Somerville, Mass., and William B. Ross, Nashville, Tenn., juniors.

Southern Maryland.—On application of the creditors, R. C. Coombs and R. B. Chew have been appointed receivers.

Texas & New Orleans.—The officers of this company, organized by the owners of the old Texas & New Orleans road, are as follows: President, John T. Terry, New York; Vice-President and General Manager, J. F. Crosby, Houston, Tex.; Treasurer, T. W. House, Houston, Tex.

Panama.—Mr. Frederick Chandler has been chosen a director in place of Wm. Butler Duncan, who has resigned.

PERSONAL.

—Mr. Walter Kattie, long Western agent and engineer of the Keystone Bridge Company, is now City Engineer of St. Louis.

—Mr. W. B. Greenlaw, President of the Memphis & Little Rock Railroad Company, died at his residence near Memphis, Tenn., August 23, of dropsy of the heart. He was 60 years of age.

—Mr. R. C. Hughes, Secretary of the Gulf, Colorado & Santa Fe Railroad Company, died in Galveston, Tex., August 5.

—Mr. C. E. S. Stewart, formerly Mechanical Superintendent of the Panama Railroad, has just sailed for Venezuela, South America, on important business for the Portland Company. He expects to be absent from the United States about four months.

THE SCRAP HEAP.

Railroad Manufactures.

The Keystone Bridge Company recently completed an iron bridge 163 feet long for the New Jersey Central, at Kimmel's Lock, near Catasauqua, Pa., and is now erecting another one, 156 feet long, near the same place.

The Southwestern Car Works at Jeffersonville, Ind., are building a number of refrigerator cars for the Union Line, and have a good deal of repair work on hand.

The Springfield (Mass.) *Republican* says: "The iron works of Berkshire County are succumbing to the dull times. Colby's works at Lanesboro' have been idle for some weeks. The Richmond Company have enough manufactured stock piled up to supply any ordinary demand for two years, and are using up balances of ore and charcoal preparatory to closing the furnaces, although it continues taking ore from the Shaker beds. The Pomeroy Iron Company at West Stockbridge have 5,000 tons accumulated, ready for the market, and will probably not run much longer unless there is a great revival of business."

It is said that the Philadelphia & Reading Coal & Iron Company has made a proposition to furnish the forty or more furnaces now out of blast along the Reading Railroad and branches with iron ore, limestone and coal, and to take the product off their hands, paying the cost of manufacture. The proposition, it is said, is being responded to favorably by the establishments in that region, and there is a fair probability of all the furnaces being again in blast within the next three months. Of the twenty anthracite furnaces in Berks County sixteen are out of blast, while two new furnaces are about being completed—one at Lyons and the other at Bechtelsville.

The Toronto Car Wheel Company, besides an extensive Canadian business, has of late done a great deal of work for foreign countries,—South America, France, England, Scotland, etc. It is now working on an order for a railroad on the continent of Europe.

The Pittsburgh *Manufacturer* says: "The Culmer Spring

Works, which were destroyed by fire some weeks ago, have been rebuilt. New and improved machinery has been put in and the capacity of the works very much increased. In a word, the establishment is in every respect better than it was before the fire.

The Barney & Smith Manufacturing Company at Dayton, O., recently shipped 20 box and 20 flat cars to the Hot Springs Branch road of Arkansas. They are all fitted with air brakes.

OLD AND NEW ROADS.

Oregon & California.

The Portland (Oregon) *Evening Journal* of Aug. 7 published the following: "It is reported that the negotiations which have been in progress for some time past in the East, between Ben Holladay and the Central Pacific Railroad Company, of California, in reference to the purchase of the east and west side railroads in this State, have been brought to a conclusion. We have no figures as to the purchase price, and have only been informed in general terms that the bonds based on the two roads will be retired by a new issue of bonds of the Central Pacific Company, which will include a new loan from the bondholders sufficient in amount to complete the construction of the east-side road to a connection with California roads.

The "East-side" and "West-side" are the local names in Oregon for the Oregon & California and the Oregon Central roads.

Freight Rates from Chicago to the Southwest.

A meeting of railroad officers was held in Chicago, August 16, for the purpose of agreeing upon rates from that city to points on the Missouri River. After a long discussion it was finally agreed to return to the passenger rates in force before the recent war began. As to freight rates, the tariff of April 20, 1875, was adopted with some changes.

The new tariff is as follows:

CHICAGO TO	First class	Second class	Third class	Fourth class	Special class	Class A per car	Class B per car	Class C per ton
Atchison, Ke.	\$1.00	.75	.60	.45	.40	\$80	\$80	\$6.00
Council Bluffs, Ia.	1.00	.75	.60	.45	.40	80	70	6.00
Hannburg, Iowa	1.00	.75	.60	.45	.40	80	70	6.00
St. Joseph, Mo.	1.00	.75	.60	.45	.40	80	70	6.00
Kansas City, Mo.	1.00	.75	.60	.45	.40	80	70	6.00
Leavenworth, Ka.	1.00	.75	.60	.45	.40	80	70	6.00
Liberty, Mo.	1.00	.75	.60	.45	.40	80	70	6.00
Denver, Col.	3.60	2.75	2.35	1.85	1.75	290	230	.....
Fort Scott, Kas.	1.50	1.25	1.00	.80	.65	140	130	.....
Hannibal, Mo.	1.00	.50	.40	.30	.62	70	60	.....

The rate on lumber was fixed at \$60 per car and on salt at 70 cents per barrel. The new rates were to take effect August 25.

Erie.

The long fill over the Cascade Ravine, near Susquehanna, was washed away on the afternoon of the 18th, by a sudden and heavy freshet, which the culvert proved entirely insufficient to carry off. This fill was 400 feet long and 150 feet high in the center, and replaced a trestle which was built there when the road was first constructed. About 225 feet of it were carried away. At first trains were sent through over the Delaware, Lackawanna & Western from Binghamton, but afterward passengers were transferred at the break. A temporary trestle was begun at once and completed so quickly that the first train passed over it on the evening of August 22.

The Receiver, Mr. Jewett, has filed with the court his statement of receipts and disbursements from May 28 up to June 30. A summary is as follows:

Receipts, including cash on hand May 28.....	\$3,192,008 00
Disbursements.....	2,759,605 91
Balance, July 1.....	\$432,402 09

The receipts include loans of \$780,000 from various sources, and \$20,156.50 dividends on Buffalo, New York & Erie securities owned by the company. Disbursements include repayment of loans amounting to \$250,000, and payments on account of rentals of \$105,000 to the Long Dock Company, and \$108,701.25 to the Buffalo, New York & Erie. An accompanying schedule shows the renewal of a note of \$150,000 due to the Bank of Commerce, and also that there is due the Marine Bank \$300,000 in demand loans; the Union Steamboat Company, \$30,000; the Fourth National Bank, \$300,000 (interest paid to July 1), and B. J. Greene, \$6,539.40, payable Jan. 1, 1876, without interest. A schedule of the balances of the various ledger accounts was also filed.

Cheraw & Salisbury.

At the recent election Stanly County, N. C., voted for and Rowan County against the proposed subscription to this road. A subscription is to be asked for from Cabarrus County. The road is now graded from Cheraw, S. C., north to Wadesboro, N. C., about 28 miles, with money enough subscribed to grade it to Albemarle, 25 miles further.

Chicago, Saginaw & Canada.

The track is now laid to Elm Hall, Mich., 14 miles west of the eastern terminus at St. Louis, and nine miles beyond Alma, the last point noted. More iron has been received and the work is progressing steadily. A passenger train is to be put on shortly.

St. Paul & Pacific.

In the suit brought by Weetjen and others, bondholders, to recover certain iron bought with the proceeds of the bonds, and afterward pledged to secure debts of W. G. Morehead and Jay Cooke & Co., the New York Supreme Court at general term has given a decision sustaining the demurrer put in by some of the defendants. The Court holds that the suit should have been brought by the trustees, or cause shown why it could not have been so brought. Sufficient cause was shown as to two of the trustees, but nothing was shown or alleged against the third, Mr. Horace Thompson, who was competent to act.

New Jersey & New York.

It appears that this company is considerably in arrears with the rent due for the use of the Erie tracks over which its trains run from Hackensack Junction to Jersey City, about eight miles. A demand for payment having been made without result, the Erie people, August 23, seized two cars of the company's at Jersey City and also took up the connecting tracks between the two roads at Hackensack Junction, thereby preventing trains from running to Jersey City. The amount due is said to be about \$30,000. In order to accommodate passengers, however, the Erie trains were ordered to stop at the Junction. The company made a temporary arrangement to transfer passengers to the New Jersey Midland at Hackensack.

The officers of the company say that they are ready to pay the rent due from the time Mr. Jewett was appointed Receiver, but they are not willing to pay what accrued before that time, fearing that there may be trouble about it hereafter. The reports of the earnings of the road have made a very fair showing, but on the other hand it is reported that the working expenses have been very large and that the new extension to

Haverstraw has been a drag upon the road. The business is mainly in suburban passenger travel to and from New York. An effort was made to sell bonds some months since, which, we believe, was not successful.

Texas & New Orleans.

The present owners of this road have organized a new company under the name of the "Texas & New Orleans Railroad Company of 1874," and are preparing to rebuild it and put it in operation at once. A small force has been put at work, and contracts for the whole work will be let as soon as the necessary surveys and estimates can be made. New equipment has also been ordered.

The new company has issued stock to the amount of \$2,500,000, which represents the nominal cost of the property to its present owners. A first mortgage for \$2,000,000, of which \$500,000 is reserved for the payment of the debt due the State of Texas, and, it is stated, \$600,000 has been taken by the stockholders. The road is to be rebuilt in a substantial manner, with iron bridges and other improvements.

The road runs from Houston, Texas, east by north to the Sabine River, 110 miles. It was completed and in operation in 1860, but during the war it fell into a ruinous condition and was abandoned; but after the war 40 miles of it, from Houston to Liberty, was worked so far that an occasional train was run over it. It was finally sold under foreclosure last year, after a long and tedious litigation, the sale being made subject to a lien of \$500,000 on the 70 miles from Liberty to the Sabine, held by the State of Texas, for money loaned. It has a land grant of about 750,000 acres in Eastern Texas.

Rockford, Rock Island & St. Louis.

A meeting of capitalists and railroad men was held in Davenport, Ia., August 18, to discuss the expediency of taking this road off the hands of the bondholders who lately purchased it and forming a new organization. A proposition was adopted, to be submitted to the bondholders, and a committee appointed to prepare articles of incorporation.

New Passenger Rates.

The trunk lines have finally agreed upon a regular tariff of rates between Eastern and Western cities, which took effect August 23. These rates and those of the last regular tariff (in force last spring before the war began) are as follows:

	new rate.	old rate.
Chicago.....	\$20 00	\$22 00
Columbus.....	16 00	17 50
Cincinnati.....	18 00	20 00
Indianapolis.....	19 00	21 00
Louisville.....	22 00	24 00
St. Louis.....	25 00	27 00
St. Paul.....	28 50	30 50
Hannibal and Quincy.....	27 00	29 00
Kansas City and Omaha.....	36 00	38 00

Thus to all points except Columbus the new rate is two dollars lower than the old one, which latter had been maintained with little change for some years—at least its basis, the Chicago rate, had been so maintained. The reduction amounts to 10 per cent. on the rate to Cincinnati, 9 per cent. to Chicago, 7½ per cent. to St. Louis, and 5½ per cent. to Omaha. The St. Louis rate is 25 per cent. higher than the Chicago rate; it was formerly 22½ higher. Pro-rating on this basis gives the lines between Chicago and St. Louis, one 280 and the other 300 miles long, about \$5.65 for their share of the rate. As a large part of this through travel goes in sleeping cars, with an average probability of at least a ton of dead weight per passenger, they will hardly get rich at that rate.

New Jersey Midland.

The recent heavy rains have done some damage to this road, an embankment between Oakland and Pompton having been washed out for a considerable distance and the track having been much washed all through the Pequannock Valley, above Bloomingdale. The damages were promptly repaired and a construction train is now at work strengthening weak points, clearing out the cuts and doing other necessary work. It is the intention of the receivers to continue this work as long as the means at their command will allow.

Savannah & Charleston.

The Georgia Supreme Court has confirmed the decision of the lower court in the controversy between this company and the Central of Georgia, and has refused to grant the injunction asked for. This decision shuts out the Savannah & Charleston from the use of the three miles of the Central road on which its trains have heretofore run into Savannah. The merchants of Savannah have appointed a committee to try to make some arrangements by which the Charleston trains can be again allowed to come into the city.

Eatonton, Madison & Athens.

Efforts are being made to revive this project, and meetings are to be held along the line of the road to advocate its construction. The line is from Eatonton, Ga., the terminus of a branch of the Central road, northward through Madison to Athens, a distance of 48 miles.

Pennsylvania.

The Treasurer gives notice that he will take up any of the company's bills payable due in August or September at a discount of 5 per cent. per annum, on presentation at the company's office in Philadelphia, which indicates that the company has more cash on hand than it has immediate use for.

Columbus & Toledo.

Sub-contracts for the grading between Columbus, O., and Delaware have been let to Jackson & Russell, of Columbus, and for the grading from Delaware to Toledo to John Rutherford, of Louisville, Ky., and associates. From Columbus to Delaware the distance is about 25 miles; from Delaware to Toledo, about 100 miles.

Dividends.

Dividends have been declared by the following companies: Chicago, Burlington & Quincy, 5 per cent., semi-annual, payable September 15.

Salem & Lowell, \$1 per share, semi-annual, payable on demand.

Southern Maryland.

The Maryland Circuit Court has appointed R. C. Coombs and R. B. Chew receivers of the property of this company. Some grading has been done on the line through St. Mary and Charles Counties, Md., but no track was ever laid. The appointment of receivers was made on application of the creditors.

Chesapeake & Ohio Canal.

At the regular monthly meeting of the board in Annapolis, the President reported for July a surplus of earnings over all disbursements of \$45,500, an increase of \$844 over last year, notwithstanding the decrease in tolls. The balance on hand at the close of the month was \$111,657.50. From this the board appropriated \$50,985 to pay the coupon of July, 1862, on the preferred construction bonds. This coupon is payable at the office of Alexander Brown & Sons, Baltimore, after August 25.

New Orleans, Mobile & Texas.

In a suit brought by A. T. Bennett *et al.* against the New Orleans Insurance Association *et al.* the Superior District Court at New Orleans appointed A. T. Bennett and Lyman J. Dodge judicial sequestrators and receivers of this company. The plaintiffs claim as holders of first-mortgage bonds and ask for a partition sale. The defendants claim under a former foreclosure sale to Ames, as representative of the first-mort-

gage bondholders; but the plaintiffs say that though Ames was put in possession no title has passed, because a large amount of costs remains unpaid. The appointees of the State Court have been summoned to answer for contempt before the United States Court in November.

Corpus Christi, San Diego & Rio Grande.

This company was permanently organized at Corpus Christi, Tex., at a meeting held August 11. Some 30 miles of the road have already been graded by the contractors, and the bridges are now under construction. Contracts have been let for ties and for the construction of repair shops.

St. Louis & Southeastern.

The contest between this company and the Louisville & Nashville has brought down the passenger rate between Nashville and Louisville to 50 cents. The Southeastern route, over its own road from Nashville to Nortonville and thence by the Louisville, Paducah & Southwestern, is considerably the longest, but is said, nevertheless, to be doing a large, if not a profitable business. Freight rates have also been considerably cut down.

The Missouri Railroad Commission.

The Commissioners are making arrangements to begin suits against a number of the companies for violations of the new law. Forms for the reports required by the law have been distributed to the several companies.

The Commissioners will begin the work of personally inspecting the roads, as required by law, in September. In this they will be assisted by the Secretary of the board, Mr. George C. Pratt, who is reported to be an experienced and competent engineer, who has much acquaintance with railroad practice.

Quincy, Missouri & Pacific.

It is reported that this company has finally concluded negotiations for a loan, which will enable it to complete its road to the Missouri River.

Atchison, Topeka & Santa Fe.

All arrangements have been completed for running trains to Kansas City over the newly-acquired Kansas Midland road, and regular trains were to be put on this week.

St. Louis & Toledo Air Line.

This is the name of the new company formed by the consolidation of the Toledo & St. Louis and the Shelbyville, Oconee & St. Louis companies. The necessary papers have been filed in Indiana and Illinois. The new company has no road completed.

Burlington, Cedar Rapids & Minnesota.

In the New York Supreme Court recently the Fourth National Bank obtained a judgment for \$163,940.91 against this company, on 11 promissory notes.

Union Pacific.

This company has begun suits in the United States District Court against nine more of the Nebraska Counties, to restrain them from collecting the taxes assessed upon the road for 1874.

Chicago, Millington & Western.

This company has begun laying track and has some rails down at Riverside, and a locomotive upon them. The bridge over the Des Plaines River is nearly completed.

Western, of Alabama.

The section from West Point to Opelika is now worked by the Georgia Railroad Company, and the branch from Opelika to Columbus, Ga., by the Central of Georgia. The rest of the line, from Opelika to Selma, is worked for joint account of the two companies, and is under the control of a board of six managers, appointed by the companies.

Northern Transportation Company.

At the suit of the bondholders the property of this company has been put in the hands of a receiver, and Mr. A. W. French, Agent at Ogdensburg, has been appointed to that position. The steamers have begun to run regular trips between Ogdensburg and Chicago.

Paris & Danville.

The complaint in the suit in which a receiver has been appointed, besides charging that the stock is worthless, that interest on the bonds has been in default since July, 1873, and that the present earnings of the road are not enough to pay working expenses, also alleges that the New York Loan & Trust Company, trustee of the first mortgage, is a foreign corporation, and cannot execute the trust by taking charge of the road in case of default of payment of interest, as required by the terms of the trust deed to do, and is without legal capacity to perform any act by virtue of the trust deed aforesaid. The bill asks that a receiver be appointed, and that the road and its franchises may be sold on a foreclosure.

A bill has been filed by some members of the firm of Hiram Sanford & Co. asking for an accounting and also for the appointment of a receiver for the property of the firm. This firm built the road as contractors, and its members are the leading stockholders in the railroad company.

The Paris & Danville road is now about 80 miles long, from Danville, Ill., southward to Robinson, in Crawford County. The funded debt is stated at \$1,190,000, or \$14,875 per mile.

Worcester County Central.

There is a little trouble in this company, and the North Brookfield directors have been asked to resign, on the ground that they are all engaged in the building of the North Brookfield Branch, which is regarded as an opposition road. They, however, say that their subscriptions are entitled to representation, and moreover claim that their local road can be made a part of the Central.

Springfield & New London.

The Springfield *Republican* says: "The Longmeadow Railroad directors, weary of waiting for a proposition from the New London Railroad for a connection, via Wilbraham, with Stafford Springs, have agreed to make a temporary lease of their road from the Connecticut State line in Longmeadow to the connection with the Athol road on the Hill in this city, to the Connecticut Central (Phelps') road, and expect to get \$5,000 or \$10,000 a year, or 5 to 6 per cent. on the cost, for it. They do not propose to extend the road into town at present, but to keep that and the whole future of the line open to the New London and Providence developments."

Nebraska Central & Black Hills.

A company by this name has been organized in Omaha, Neb., to build a narrow-gauge road from the city westward on the south side of the Platte River. It talks of eventually extending the line to the Black Hills, as the development of the country warrants.

Portland & Ogdensburg.

The Portland *Argus* gives a long account of this road and also of its recent opening through the White Mountains, from which we take the following: "John F. Anderson was chosen engineer soon after the organization, and he at once organized a sufficient corps of engineers and began a survey of the proposed line. The city of Portland this year, after a sharp contest, voted to give 5 per cent. of its valuation to aid the road, and it was put in the form of a subscription. On March 1, 1869, the first assessments were paid in.

"The first shovelful of dirt was thrown September 6, 1869,

and by September 12, 1870, the road was opened for passenger traffic to Sebago Lake. No difficulties were experienced in the construction save at Otter Pond, where the uncertain nature of the bottom made the process of filling somewhat difficult. On November 7, the road was opened to Steep Falls in Standish, 24 miles, and on December 26, to West Baldwin, 34 miles. An area of land with a frontage of 450 feet on Commercial street, with a water front of the same width, and a depth of water sufficient to float a vessel of 1,000 tons was purchased and the usual buildings erected. On June 5, 1871, the road was opened to Fryeburg, 49 miles, and on August 10 to North Conway, a distance of 60 miles, and was completed in season to accommodate the summer travel.

"Then came the long and bitter fight regarding the application of the road to the city to loan its credit to the road to complete the construction through the Notch. A sharp fight was had in the Legislature, but on February 27, 1872, an act was passed authorizing a popular vote on the question of loaning the city's credit to the extent of \$2,500,000. The directors decided to ask for only \$1,300,000. The discussion which preceded this vote was long and fiercely carried out. The opposition was not to the road. There is no question but that almost every citizen of Portland would have been glad to have seen the road built, but there were grave differences of opinion regarding the question of the city's loaning its credit to such an extent. On the first vote the proposition did not receive the requisite two-thirds vote, and was defeated. On July 9 a second vote was taken and the proposition carried by 2,946 yeas to 964 nays. The work from North Conway through the Notch was contracted for by Messrs. Fuller & Harding, who were to receive their pay half in bonds of the city and half in bonds of the road. Work was recommenced on August 16, 1872, and August 5, 1873, the road was opened up to Upper Bartlett, and on August 31, 1874, to Bemis, 72 miles from Portland.

"Then the difficult part of the work was begun, the successful completion of which was duly celebrated on Saturday. To ride over the completed work one can hardly appreciate the marvels of engineering skill, the patient endeavor and hard labor that have been required to work out this mighty problem. This was the part of the work which had been declared to be an impossibility, and indeed it would have seemed so. But Mr. Latrobe was confident it could be done, and Mr. Anderson and he pushed through the surveys, and the work will ever remain a monument to their engineering skill.

"The elevation to be surmounted was 1866.26 feet from tide water, or 1266 feet from Upper Bartlett. A grade of 116 feet to the mile was established, and with the exception of a few short stretches, this grade is nearly uniform from Bemis station to the gateway of the Notch. After leaving Bemis the road goes through a short rock cut, and crosses Nancy's Brook. From this point to Frankenstein the road passes a succession of spurs and dips on the side of the mountain, now running through some rocky cut, and now jumping a ravine. * * As the train rounded Frankenstein cliff, it passed through a long rock cut, in which we were hidden for a moment. Coming out of this, the train crossed the immense iron trestle over the ravine beyond. * * It had been announced that the road would be ready for the passage of the train at twelve o'clock. At just ten minutes of twelve the train arrived at Dismal Pool, which was the only uncompleted portion. Here it stopped. Just ahead, on the trestle bridge, was a crowd of workmen. A few gentlemen from the train went forward. The last connecting rail was in position, and General Anderson, seizing a sledge, gave a few heavy blows and the last spike was driven home. Hon. W. W. Thomas, Jr., enthusiastically swung his hat and cried, 'Three cheers for General Anderson and the last spike which completes the railroad which pierces these everlasting hills,' and the crowd swung their hats and shouted 'Hurray, hurrah, hurrah,' and a crowd of workmen at a little settlement across the valley swung an improvised flag and faintly echoed back, 'Hooray, hooray, hooray.' Then a brass field piece which had been loaned by General Murray for the occasion awoke all the mountain echoes and sent them reverberating far down the valley by repeated discharges. After stopping here a few minutes, giving the passengers a chance to look down at Dismal Pool, reposing in the valley three hundred feet below, or across at the beautiful Silver Cascade, a slender thread of water which leans down the side of the mountain, glistening and sparkling as an occasional ray of sunshine pierced the clouds and fell upon it, or at the Flume which much resembled it in the distance. The rain had cleared and the heavy clouds had begun to break away as we passed through the long cut through the giant spur of Mt. Willard which makes one side of the gateway of the Notch. This is 450 feet long at sub-grade, 150 feet on top and 54 feet deep. To excavate this work has been a most laborious process, and has always been considered the key of the work. The original Notch gate still remains the same, the railroad passing to the left of it. We can look back at this point and reckon up what we have glanced at as we came along.

"It is 11 miles from Bemis station to the Fabian House. Till you reach Bemis there is no grade steeper than 95 feet to the mile. Mr. T. E. Peverley located the line from the Crawford Notch summit along the precipitous side of the Notch gate and Mt. Willard and the steep slopes of Mt. Willey to the plain of the Saco valley, some six miles from the summit to a point about a mile below Frankenstein Cliff. His descending grade was 2 1/10 feet in 100 feet, or 116 feet per mile, (which was suggested by the great engineer, Mr. Benj. H. Latrobe,) with a reduction in this rate to one foot in 100 feet, or 52.8 feet per mile, at Cow Brook, about midway of the steep decline. Commencing at the summit near the Crawford House with a grade of one foot in 100 feet, or 52 8/10 feet per mile, the line is carried west of the Saco, through the ledge points or cliffs which protrude from the great spur of Mount Willard upon the gate of the Notch. This grade of one in 100 is continued until past a sharp curvature round the Dismal Pool—the point reached by a locomotive on Wednesday last. There the quicker descent of 116 feet per mile begins, and is continued with a curvature to the west till past Mount Willard and the Willey Brook, which is crossed over a deck bridge 150 feet span, 85 feet above the torrent, then past the Willey House at the rear, 300 feet above the highway, and 760 feet to the west to Cow Brook, 3.22 miles, where the grade is 52.81 feet per mile for 1,100 feet. There the grade of 116 feet per mile is lessened to Frankenstein Cliff, for one and a quarter miles. Here the line enters the projecting point of the cliff for about 400 feet, to avoid as much as practicable of the deep gorge. Then for a distance of 1,200 feet the grade is reduced to 1.42 feet in 100 feet, or 75 feet per mile. Then the grade has again a uniform descent of 116 feet per mile for a distance of 2.37 miles to a quarter of a mile above the old Mount Crawford Hotel. Then there is a descent of 87 feet for a half mile to Bemis. The road passes, after leaving the Crawford House, to quarter of a mile west of Lewis's new steam saw mill, directly in front of the Fabian House and White Mountain House. The grade from the Crawford Summit to the Fabian House is 96 feet per mile."

A Portland correspondent of the Boston Herald gives the following account of this company's contract with the Eastern Railroad Company: "It was felt that it was of great importance to the road that it should connect by an independent line with Montreal. The Montreal, Chambley & Sorel Railroad, in process of construction, proposed to supply that link, provided certain aid could be extended to it, and provided also a through line to Boston as well as Portland could be secured. Proposals had been made to the directors of the Vermont Division of the Portland & Ogdensburg by the managers of other railroad interests leading to Boston to obtain the control of so much of the

business of the line as was destined for Boston, in consideration for which aid was promised towards building and stocking the line. If consummated, such a proceeding would have drawn the business from the terminus at Portland, and their portion of the road would have had no influence in the councils of the new combination. After a thorough examination of the line through to Montreal, the Eastern Railroad made a proposition for the business to and from Boston and other places on their line, provided the whole line from Montreal to Portland could be made a unit (securing a close connection for their Eastern Maine and provincial business with Montreal), and provided they could have the business to and from Boston. They agreed to do the business at their Conway Junction for 70 per cent. of the gross receipts, and appropriate the remaining 30 per cent., first, to the payment of the coupons on certain bonds of the companies composing the line so long as the companies fail to earn this interest; secondly, to the purchase of these bonds so long as they could be bought in the market at or below par. On the 21st of November, 1873, a contract between the several companies forming the line in Canada and Vermont and the Eastern Division of the Portland & Ogdensburg was signed, the rates to be settled by a committee of two directors chosen by the companies west of the Connecticut, and two by their road, and in case of disagreement a disinterested umpire to decide; the rates not to discriminate against the business interests of Portland. An addition of ten miles constructive mileage was granted to the Portland road in the pro rata division of receipts on through freights destined to or from Boston or points on the line of the Eastern Railroad. The 30 per cent. received under the traffic guarantee from the Eastern road was to be divided in the same manner. When the 30 per cent. was from business originating on the Portland road or passing to and from that road and the Eastern, without passing over any other roads forming the through line, the whole 30 per cent. was to go to the Portland road. The Eastern road then signed the contract with all the above companies also granting the Portland road the use of its passenger grounds in this city, and also allowing the Portland road the pro rata for the 20 miles haul of all the Eastern's business coming over that road less than 20 miles west of North Conway."

American Securities in Holland.

Under date of Aug. 9, Dr. de Klerck writes from Amsterdam: "The stock markets have all been very dull this week. The bad news about the Peruvian guano, which is, however, supposed to be in great part the work of brokers' machinations, dragged down not only the Peruvian bonds 2 1/2 per cent., but the entire foreign market.

"In the American market 5 per cent. United States bonds of 1871 rose to par, Louisiana advanced to 30.

"The greatest activity was in the different bonds of the Chicago & Northwestern. Consolidated rose 2 1/2; there were buyers for New York account. The preferred stock advanced 3/4 per cent., Milwaukee & St. Paul, 1/4; Michigan Central, 3/4 per cent. Illinois Central shares receded from 85 1/2 (ex-dividend) to 83, closing at 84 1/2. The cause of this fall was the inundations, but as soon as it was known that the Illinois Central did not suffer much from them they recovered again. West-Wisconsin are bought daily by New York brokers here. Every bond coming into the market goes into their hands. In Missouri, Kansas & Texas and Union Pacific Southern Branch the market was very dull. The smallest sales depressed the market from 1/4 to 1/2 per cent. It is feared, and with good reason, that the scheme cannot be carried out, on account of the decrease of earnings. Unless the company will act fairly and appoint a Holland controller, or invite the bondholders to select and appoint one with full power, our people will never trust it again, but continue to hold back.

"St. Paul & Pacific 7 per cent. branch line rose 2 1/2 per cent. Nothing up to this time is heard from Mr. Carp's mission. The members of the St. Paul & Pacific Committee, and also the firm of Boissevain Brothers, who are generally believed to act as brokers of Carp, continually bought 7 per cent. Main and Branch Line bonds (called here "first and second sections"). In Vincent & Brainerd Extension bonds there was very little business.

"In Chicago & Southwestern the market recovered again 1 1/2 per cent.

"The last day of the week California Pacific Extension, for which 25 was asked without bids, for a fortnight, rose to 28 1/2, as it is rumored that the late denied proposal of arrangement will be soon a reality."

Santa Clara & Alviso.

It has been proposed that this projected road, which is to connect Santa Clara and San Jose, Cal., with deep water near Alviso, shall be built and owned entirely by the towns named. The authorities of both towns have considered the matter, but have postponed a decision until an attempt has been made to raise the money by private subscription.

Carson River.

A railroad is to be built from Carson City, Nevada, up to the head of the Carson Canon, about 40 miles. It will open a large lumber district.

San Francisco & North Pacific.

Preparations are being made to build the branch from Fulton, Cal., to Guerneville, for which surveys were made and the right of way secured last year.

Indianapolis & Springfield.

This company gives notice that sealed proposals will be received for the construction of the road from Montezuma, Ind., to Danville, Ind. (about 49 miles), up to September 10, at the company's office in Crawfordsville, Ind. Bids will be received for the completion of the whole road, including grading, tieing, bridging, ironing and equipment, or for the completion of either one of three separate sections, as follows: First Division, from Montezuma to the east line of Adams township, Parke County; Second Division, from said point to Bainbridge in Putnam County; Third Division, from Bainbridge to Danville. Bids will also be received for each separate class of work. Profiles and specifications can be seen at the office of the President and Chief Engineer, at Crawfordsville, Ind.

New Mail Routes.

Mr. George S. Bangs, the General Superintendent of Railway Mail Service, has issued the following orders for extensions of mail service:

Chicago, Danville & Vincennes.—Extend service so as to commence at Robinson and run via Trimbals to Hutsonville, Ill., 8 miles. This is all another extension of the Paris & Danville railroad.

Galveston, Harrisburg & San Antonio.—Extend service from Harrisburg to Kingsburg, Tex., from September 1, 1875.

Vermont Division Portland & Ogdensburg.—Change service to commence at West Concord, and extend from Hyde Park to Johnson, Vt.

Costa Rica Railroad.

The Panama Star and Herald of July 6 says: "A report on the condition and progress of the Costa Rica Railroad drawn up by the director, William Nanne, in May last, and presented to the Minister of Public Works of the Republic, is published in the Official Gazette. The report relates to the progress of the railroad, which, since May, 1874, has had devoted to it every effort tending to preserve what had been accomplished, and to carry out the obligations of the enterprise arising out of the contract with Mr. Keith. The state of the road at that time, that is to say, when it passed into the hands of the Supreme

Government, was as follows:—According to the statistics given there were 34 1/2 miles concluded, over which trains were running, 14 1/2 miles were ready to receive the rails, 24 were being graded, five were without any construction going on, and 64 miles were cleared of trees. At present there are on the east side of the line 22 1/2 miles between Limon and Matina open to traffic, and on the west from Alajuela to Cartago 27 miles. The 18 miles to the west of Matina, and about ten miles to the east of Cartago, are leveled and cleared. The existing camps on the line and the plant have naturally suffered from the work being suspended. Towards the Atlantic, on the coast lands, the line, on which a certain amount of traffic is carried on, as well as the bridge of Moin and the swamps, require some repairs which can be effected without much cost, but which, unless done shortly, will cause a greater expense in the future. In eighteen months there have passed over the road from Alajuela to Cartago 157,757 persons, yielding an income of \$126,610 for passengers and \$10,433 for freights. In spite of the severe rainy seasons of Costa Rica, and the great number of animals which are continually traversing the road, it is satisfactory to know that as yet no accident has occurred, and is also a proof of the prudent management of the trains. Each locomotive in service has passed over monthly, on an average, a distance of 1,500 miles at a cost of about \$500 for keeping up repairs. On the 1st of November, 1873, the time when the Government took charge of the road, there had been received on account of the old contract \$5,916,125. Since that date the Government has advanced \$962,928, amounting in all, with other incomes, to a total of \$1,413,389, all of which had been dedicated to the work according to the statement given in the report.

"In the month of May last the Costa Rica Railroad, for passages, freights and telegrams received \$10,916, that for the month of April being \$9,077. In the month of May, 1874, under the old tariff, 8,154 persons used the line, producing \$6,374, while in the same month of 1875 there were 14,555 passengers."

Atlantic & Great Western.

At a meeting of the holders of the leased lines rental trust bonds of 1872,

M. C. M. Lewis, M. P., the Chairman, said that the terms of settlement generally proposed by the committee appointed June 30 were as follows: That there should be one entire lease of the three leased lines at a single rent; that the rental for the first three years should be equal to 4 per cent. sterling of the entire issue of bonds—namely £1,100,000—after deducting bonds since paid off, and plus the rental of the Cleveland & Mahoning bonded debt; that the rental should be equal to 6 per cent., and that the rent for the year 1875 should be carried back to the 1st of January last on the 4 per cent. scale, so that the trustees for the bondholders should receive the entire year's rent for 1875; and that the Ohio debt should be paid off, so as to leave nothing standing before the leased lines bondholders as to their security. He went on to say that those terms had been assented to by the first-mortgage bondholders and Mr. McHenry. The committee recommended that the consent of the bondholders should be given to the scheme in a certain form, which he read, the principal provision of which was that it should be proved to the satisfaction of the committee that the three leased lines were leased to the Atlantic & Great Western at several rents, and not at one rent on the three lines.

The report of the committee was adopted by the meeting.

Peoria & Rock Island.

Our attention is called to the fact that the report to the Court by Mr. Hilliard, the Receiver, given in the Railroad Gazette of Aug. 14, is a statement of the account of cash received and expended, for whatever purposes, and not of the earnings and working expenses of the road. For May and June last the latter, as reported by the Auditor, were:

Earnings:	May.	June.
Freight.....	\$17,555 63	\$17,507 40
Passenger.....	4,191 00	5,127 00
Mail.....	460 00	460 00
Express.....	212 42	212 42
Miscellaneous.....	2,909 41	143 65
Total.....	\$ 5,328 46	\$23,460 47
Operating expenses.....	\$15,230 97	\$15,162 42
Excess of earnings.....	\$10,037 49	\$8,298 05
Increase of net earnings over corresponding month of last year.....	6,793 11	5,149 71

This shows the actual working expenses to have been 60.4 per cent. in May and 64.6 per cent. in June.

Chicago, Danville & Vincennes.

Mr. F. W. Huidekoper, of Meadville, Pa., Chairman of the Bondholders' Committee, has issued a circular to the first-mortgage bondholders under date of Aug. 10. In this he says that many of them had been induced in the latter part of 1873 and first part of 1874, by false representations as to the condition and liabilities of the company, to fund their coupons into "certificates of indebtedness" and "convertible mortgage bonds." June 6, 1874, coupons had been funded from 2,497 out of 4,000 bonds. The interest on these funded coupons was paid to some holders Feb. 1 last, but not to others, and on Aug. 1 last none were paid. By the terms of the agreement the bondholders are entitled to receive back from the Trustee, Wm. E. Fosdick, the funded coupons on surrendering the certificate of indebtedness or convertible mortgage bond received for it. The committee of which Mr. Huidekoper is chairman recommends holders to demand the return of their funded coupons immediately, that they may be in the same position with those holders who refused to fund. The committee have tendered certificates to Fosdick, who refused to surrender the coupons. The committee will attend to this matter if holders will send their bonds to their Treasurer, T. W. Shannon, care of National Trust Company, No. 261 Broadway, New York.

During July the railroad company, through its attorney, applied to the United States Court in Chicago for an order requiring the Receiver to pay the interest on these funded coupons. The Committee's attorney resisted this, arguing that a funding scheme to be effective must include all the bondholders, and that the Court had no right to pay the earnings of the road to a part of the bondholders, all of whom have an equal lien on the property. The Court refused to grant the order.

On the 10th of June the Committee, by permission of Judge Drummond, filed an amended and supplemental bill, charging the Trustees with the various derelictions of duty and failure to guard their trusts, as reported by the Investigating Committee in April last, and the officers of the company with the issue of fraudulent and illegal bonds and with the diversion of the proceeds of bonds sold and of the earnings of the road from their proper purposes. This bill the company and Trustees have been ordered by the Court to answer.

The Committee has also been allowed by the Court to intervene in the Fosdick suit of foreclosure with the same right to be heard in that case and to the same extent as the Trustees themselves. The Investigating Committee in April last expressed the opinion that this suit was not brought in good faith to protect the bondholders' interests, and the Committee thinks the manner in which it has been allowed to drag its proof that their surmises were correct; for although this suit was brought in February last, the company has not been compelled to answer the bill until within a few days, and then only did they do so when the Committee's counsel insisted that it was the duty of the counsel of the Trustees to take a decree for want of such answer. The

main defence set up by the company is that part of the bondholders funded their coupons and the others gave their acquiescence, by non-action, and consequently there is no default. Several floating debt creditors have lately filed petitions in the United States Court asking payment of their claims prior to first mortgage bonds. The Investigating Committee in their report estimated the annual rental value of the roads from Dolton or Thornton into Chicago (24 miles) at \$83,550. Messrs. Hammond & Brown, the late Receivers—after three months' operation of the road—in their report to the United States Court, state the amount to be about \$96,000. The Committee says that such an expense is sapping the life of the road, and must continue to do so until it is rid of these leases and entanglements by a sale under foreclosure of the first mortgages. On the 8th of June Judge Gary, of the Superior Court at Chicago, rendered a decision holding the railroad company liable for the notes signed by J. E. Young, General Manager, and payable to S. J. Walker. This, the Chicago papers stated, made the company liable for \$300,000 (although the Committee believes the amount to be double that sum), for which it never in any way received any consideration. The Committee is endeavoring to obtain a decree of sale at the earliest possible moment, and is using every exertion that the bondholders may obtain control of the property which is the security for their bonds, and which by honest and efficient management will become more adequate security for the bonds. The Committee already hold the agreements of about \$1,500,000 of Illinois Division bonds—being about 60 per cent. of the whole amount—and of not quite one-half of the bonds of the Indiana Division. They urge all bondholders who have not already done so and who desire to protect their property, to forward to the Committee the agreement, properly signed, which was sent to them by the Committee in April, and a revocation of the authority of the Trustees to act for them (if such a power has been heretofore given them), that there may be a unanimity of action on the part of the bondholders. The Committee will shortly submit to the latter a plan of reorganization. In the meantime they trust that they will take no action by which they will commit themselves to any plan of reorganization looking to the retention of the lien of illegal and fraudulent bonds and claims, which the road never can pay, nor to any plan by which the control of the road shall be transferred again into the hands of the present company, or of others whose interests are inimical to those of the bondholders.

Mr. Huidekoper adds that in June he made a personal examination of the Racoon Valley (in which there are about twenty miles of grading done) and of the Brazil coal fields, and he is of the opinion that the completion of that portion of the Indiana Division from Montezuma to Brazil would add largely to the earnings of the road. In a letter from General Anderson, the present Receiver, the latter says: "I received your letter after your trip through Racoon Valley in Indiana. I am more and more strongly impressed, as I become familiar with the road and region tributary to it, that its extension to the Brazil coal fields is of vital importance, and when that is done its future success is assured."

Glilman, Clinton & Springfield.

In the McLean County (Ill.) Circuit Court, August 14, in the suit brought by the trustees under the first mortgage, Judge Tipton made an order appointing those trustees, Thomas A. Scott and Hugh J. Jewett, receivers. Subsequently, the necessary bonds having been filed, the Court approved the bond, and at the same time made an order that the receivers should deposit, as collateral, \$300,000 of the first-mortgage bonds of the Glilman, Clinton & Springfield Railroad Company, at Chicago, subject to the order of E. M. Prince, special Master in Chancery, the bonds not to be removed without the order of the Court. The old receiver, F. E. Hinckley, was ordered to deliver to the new receivers, or their authorized agents, all the property and money belonging to the road, and take their receipt for the same. And the new receivers were restrained from selling the road under the provisions of their trust deed.

The Court then proceeded to set aside both the boards of directors now claiming to be legally elected, and appointed an entirely new board, which is to hold office until a new election can be had. This board subsequently met and elected officers. Some surprise has been expressed at this appointment, as the validity of the election of the board depends upon the legality of the Morgan Improvement Company's stock, and that is involved in the Kelly case, now before the Supreme Court.

Austin & Battle Mountain.

The preliminary survey of this line from Austin, Nev., to the Central Pacific at Battle Mountain, has been completed. The distance is 82 miles. A good line is reported to have been found.

South Bay.

The track is laid on this road from the town of Eureka, in Humboldt County, Cal., along Salmon Creek for four miles. The equipment has been received, and consists of a locomotive and 10 cars. No more track will be laid at present, but the road will hereafter be extended some 12 miles further, into the redwood forests.

Stockton & Ione.

Work is again progressing on this road, and tracklaying will soon be begun.

North Pacific Coast.

The work of extending this road northward from the present terminus at Tomales, Cal., has been begun. Contracts have been let from Tomales to Duncan's Mills, the work to be completed by May 1, 1876.

Navarro River.

This road is to be built from the mills of the Navarro Mill Company, in Mendocino County, Cal., about eight miles up the Navarro river to the redwood timber. It will be used mainly to haul logs.

Jeffersonville, Madison & Indianapolis.

The Indianapolis Journal says: "This company will this week complete improvements in the Madison branch of the road which have been in progress for two years past. Miles of trestle-work have been replaced by a solid stone and dirt road-bed. At Graham station the trestle was a very lengthy one, standing 85 feet high at some points. At Vernon and Dupont were others ranging from 40 to 60 feet in height. These have all given place to these solid improvements which have cost the company in the neighborhood of \$30,000."

Paw Paw & South Haven.

It is proposed to build a road from Paw Paw, Mich., northwest through Lawrence and Bangor to South Haven, about 25 miles. The owners of the old Paw Paw Railroad are the principal movers in the project.

ANNUAL REPORTS.

Atchison, Topeka & Santa Fe.

This company owns a line from Atchison, Kan., to Granada, C., 482.1 miles, and it leases the Wichita & Southwestern road, from Newton, Kan., to Wichita, 27.3 miles, making 509.4 miles in all. The road is now being extended westward to Las Animas, Col., and by the lease of the Kansas Midland a branch on the east to Kansas City has been secured.

The equipment consists of 38 engines, 22 passenger and 7 baggage and mail cars; 319 box, 100 stock, 42 platform, 294 coal and 16 caboose cars.

The capital account was as follows at the close of the last

Capital stock (\$17,873 per mile).....	\$8,615,000
First-mortgage bonds.....	\$7,041,000
Land-grant bonds.....	3,353,000
Consolidated bonds.....	3,050,000
Bonded debt (\$27,955 per mile).....	13,474,000
Notes payable.....	\$530,000
Land-income bonds.....	475,000
Total floating debt (\$2,086 per mile).....	1,005,000
Total stock and debt (\$47,914 per mile).....	\$22,094,000

There are also \$523,500 Pottawattomie bonds, the liability on which is contingent. The annual interest charge on the debt is \$1,037,280 (\$2,152 per mile), of which \$943,180 is payable in gold. The rental of the Wichita road is 35 per cent. of the gross earnings, the lessee guaranteeing that the amount shall not be less than the interest on the bonds.

The work done during the year was as follows:

	1874.	1873.	Inc. or Dec.	P. c.
Train mileage.....	796,946	863,776	Dec. 66,830	7.7
Passengers carried.....	69,689	78,764	Dec. 9,075	11.6
Freight.....	7,597,618	6,886,317	Inc. 711,301	11.1
Tons of freight carried.....	186,812	185,033	Inc. 1,779	1.9
Tonnage mileage.....	27,496,379	24,958,965	Inc. 2,537,414	10.2

The earnings of the road were:

	1874.	1873.	Inc. or Dec.	P. c.
Passengers.....	\$341,979 21	\$245,674 18	Dec. 96,305 03	39.2
Freight.....	836,197 39	805,550 71	Inc. 30,646 68	3.8
Other sources.....	72,638 09	65,535 35	Inc. 7,102 74	10.8
Total.....	\$1,250,805 69	\$1,116,761 24	Inc. 134,044 45	12.0
Work'g expenses.....	557,641 84	786,060 05	Dec. 228,418 21	20.0
Taxes.....	67,100 52	.....	.....	.....
Expenses & taxes.....	\$624,742 36	.....	.....	.....
Net earnings.....	\$626,063 33	\$431,101 19	Inc. 194,962 14	45.2

	1874.	1873.	Inc. or Dec.	P. c.
Gross earnings per mile.....	2,457 98	2,390 49	Inc. 67 49	2.8
Net earnings per mile.....	1,239 99	846 96	Inc. 393 03	45.2
Per cent. of expenses.....	44.58	64.57	Dec. 19.99	31.0
P. c. exp. & taxes.....	49.95	.....	.....	.....

Of the land grant there had been certified to the company at the close of the year 2,456,393 acres. The total sales of land to the close of the year were 451,191 acres, for \$2,344,592, an average of \$5.19 per acre. There were, at the close of the year, balances amounting to \$1,731,229 50 due the company on land contracts.

Detroit, Lansing & Lake Michigan.

This company owns and works a line from Detroit, Mich., west by north to Howard, 164 miles, with branches from Kidville to Belden, 2 miles, and from Ionia to Stanton, 25 miles, making 189 miles in all. There are 21 miles of sidings.

The equipment of the road consists of 26 engines, 26 passenger, 6 baggage, express and mail cars; 249 box, 25 stock, 450 platform, and 11 caboose cars; 1 pay-car, 1 wreck and 2 boarding cars.

The property was represented as follows at the close of the fiscal year, December 31:

Stock (\$8,879 per mile).....	\$1,678,100
Bonded debt (\$32,032 per mile).....	6,054,000
Total (\$40,911 per mile).....	\$7,732,100

The amount paid on interest account during the year was \$235,933.53, and \$253,080 interest fell due and was not paid. The annual charge on the bonded debt is \$484,320, or \$2,563 per mile.

The earnings for the year were as follows:

	1874.	1873.	Inc. or Dec.	P. c.
Passengers.....	\$222,393 48	\$235,904 23	Dec. 13,510 75	5.2
Freight.....	559,071 45	433,804 21	Inc. 125,267 24	28.4
Other sources.....	26,632 22	27,328 52	Dec. 696 30	2.5
Total.....	\$808,097 15	\$700,037 96	Inc. 108,059 19	15.4
Expenses and re- newals.....	476,820 20	.....	.....	.....
Taxes.....	14,586 68	.....	.....	.....
Total.....	\$491,406 88	.....	.....	.....
Net earnings.....	\$316,690 27	.....	.....	.....
Gross earnings per mile.....	4,273 53	3,755 20	Inc. 518 33	13.8
Net earnings per mile.....	1,673 49	.....	.....	.....
Per cent. of expenses.....	59.03	.....	.....	.....
Per cent. of expenses and taxes.....	60.34	.....	.....	.....

The road carried 281,817 passengers and 269,267 tons of freight. Out of net earnings \$34,763.34 was paid for permanent improvements. The net earnings were 5.22 per cent. on the bonded debt.

Improvements include a passenger house at Ionia, two stories in height, the lower portion to be used for general business, and the second floor for headquarters of the company, except Superintendent and freight agents. The track has been ballasted, and the grade improved at various points. Additional sidings, made necessary by the increase of traffic, have been put down to the extent of 8.8 miles and additional depot grounds were bought at several points.

Concord.

This company during the fiscal year ending March 31, 1875, worked the following lines:

	Miles.
Concord Railroad, owned, Nashua, N. H., to Concord.....	35
Concord & Portsmouth, leased, Manchester, N. H., to Portsmouth. 41	41
Manchester & North Weare, leased, Manchester to North Weare. 19	19
Suncook Valley, leased, Suncook, N. H., to Pittsfield.....	17.5
Total.....	112.5

The capital stock is \$1,500,000, or \$42,857 per mile owned. There is no funded debt. The contingent account, which apparently represents earnings invested, amounts to \$181,225.22.

Two new engines have been completed during the year, and 2 box and 16 flat cars built to replace old ones worn out. The equipment consists of 37 engines, 49 passenger train and 775 freight train cars.

The earnings of the year were as follows:

	1874-75.	1873-74.	Inc. or Dec.	P. c.
Passengers.....	\$371,213 87	\$372,741 63	Dec. 1,527 66	0.4
Freight.....	608,681 16	636,943 86	Dec. 28,262 70	4.4
Other sources.....	26,105 48	81,783 33	Dec. 55,677 85	68.1
Total.....	\$1,005,960 51	\$1,091,468 82	Dec. 85,508 31	7.8
Working expenses.....	692,946 29	736,696 99	Dec. 43,750 70	6.1
Net earnings.....	\$313,014 22	\$354,771 83	Dec. 41,757 61	13.3
Gross earnings per mile.....	8,315 12	9,257 23	Dec. 942 11	11.2
Net earn. per mile.....	2,763 59	2,708 62	Inc. 54 97	2.0
Per cent. of exps.....	69.00	77.38	Dec. 8.38	10.8

The road has been kept in good condition, and the amount of supplies on hand at the close of the year is nearly \$40,000 in excess of the previous year, the increase being mainly in fuel and in old rails ready for re-rolling.

During the year 508 tons of new steel rails have been laid, 1,425 tons of iron rails taken up, repaired and re-laid, and 70,200 new ties laid. There were 8 1/2 miles of double track ballasted with gravel; 8,069 feet of new sidings were laid, nine miles of new fence built, and the truss bridges at Hooksett and Kelly Falls rebuilt.

The income account was as follows:

Net earnings.....	\$310,904 22
Taxes on capital stock.....	\$44,136 13
Manchester & Lawrence road.....	47,891 89
Rent, Concord & Portsmouth road.....	25,000 00
Balance.....	116,726 02
Appropriated for new rails.....	\$40,000 00
" unsettled claims.....	2,500 00
" dividends, 10 per cent.....	150,000 00
Balance to contingent fund.....	\$1,676 20

The business with the Manchester & Lawrence road continues to be done under a parole agreement, as has been the case ever since the Supreme Court declared the former contract between the two companies illegal.

The Late James Millholland.

From the Reading Times and Dispatch of Aug. 21, we copy the following notice of the life and recent death of this eminent mechanical engineer, who did so much towards the improvement of the locomotive in this country:

James Millholland, Esq., a prominent and well-known citizen of Reading, died at his residence, No. 132 North Fifth street, at seven o'clock Wednesday morning, after a lingering illness, in the 63d year of his age. About two and a half years ago Mr. Millholland was attacked with pneumonia, which eventuated in the chronic pulmonary complaint that finally proved fatal. He spent last winter with his family at Aiken, S. C., returning home about the middle of June without any permanent improvement in his health. Though it was evident at different periods throughout his illness that recovery was impossible, it was not until within a week past that his immediate decease was apprehended. So long and so tenaciously had his iron constitution resisted the approach of the destroyer that not even his medical attendants could predict with any degree of assurance how long he might last, until certain fatal complications of his disease recently began to make their appearance. Though he had toward the last suffered considerable pain, his end was rational and peaceful.

Mr. Millholland was born in the city of Baltimore October 6, 1812. He was the oldest son of Robert D. Millholland, who was engaged in the business of manufacturing fittings for ships. He received a private school education, and evinced an early proficiency in mathematical and geographical studies. Exhibiting also a special genius for mathematics, he was at the age of eighteen apprenticed as a machinist, and assisted in the construction of the first railway locomotive built in the United States, which was the invention of Peter Cooper, of New York, and was manufactured for the Baltimore & Ohio Railroad. He was also employed in the building of several other of the earlier patterns of engines, becoming thus identified with the construction of the locomotive from its earliest history in this country. At that day the facilities for the different branches of mechanics were very imperfect, necessitating severe manual labor, and one result of his own rigorous experience was the consideration care which he ever exercised in the amount of physical exertion which he exacted from those under his superintendence.

In 1832 he went to the city of New York, and was employed in the Allaire Iron Works, the principal business of which establishment was the manufacture of marine engines. Here was constructed the machinery for the first American steamers which sailed from that port, those of the New York & Charleston line. In 1836 he was employed to erect the machinery of a large steam saw-mill constructed at the above works for Robinson, Martino & Co., of Mobile, Ala., who employed him to superintend its operation, at the then unusually large salary of \$10,000 a year. This establishment having succumbed to the financial crisis of the following year, he returned to New York, and in 1838 became Master of Machinery of the Baltimore & Susquehanna—now Northern Central Railroad—which was completed in that year from Baltimore to York, Pa. He did much to improve the mechanical and engineering facilities of this road, and while in its employ designed and applied his first inventions, a wooden spring for cars and a drum brake, afterward modified into a lever brake, the earliest contrivance for applying the brakes simultaneously to all the wheels of an eight-wheeled car. A cast-iron crank axle for locomotives, which, with the combinations he employed, successfully took the place of the wrought-iron axle, then generally supposed to be the best adapted for this purpose, was another of his productions.

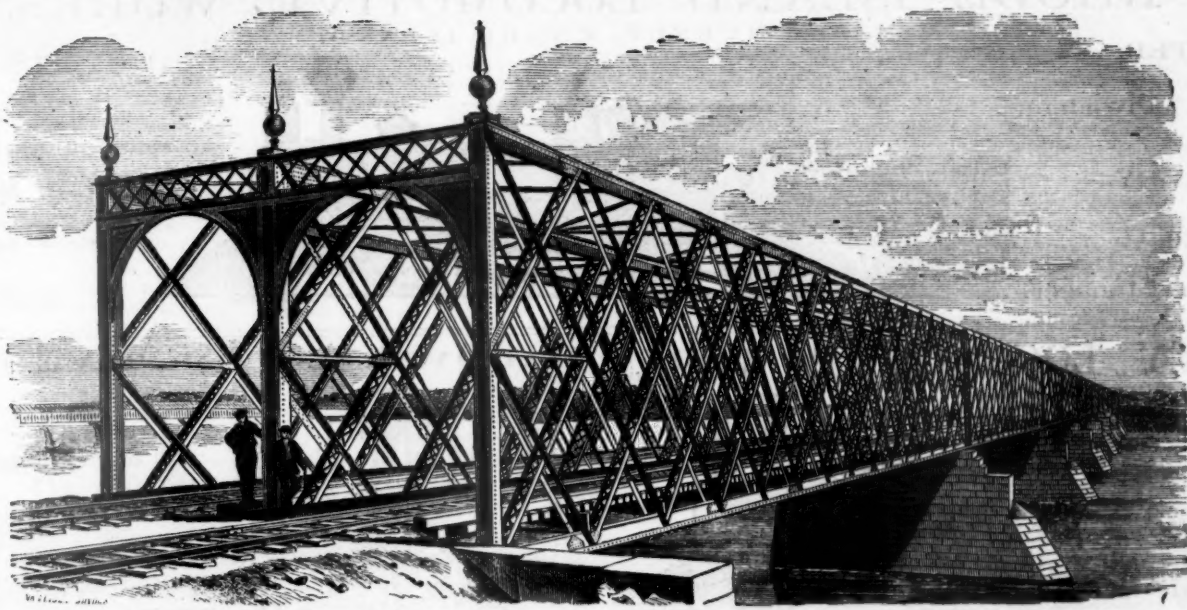
In 1848 he was employed by the Philadelphia & Reading Railroad Company in the capacity of Master of Machinery to succeed Lewis Kirk, and removed to Reading. During the 18 years in which he occupied this position he did much to advance the mechanical equipment of this road to its present high standard of perfection. He applied to its locomotives a very important improvement known as the wrought-iron hollow-grate bar, through which water is made to circulate, preventing the destruction of the material by the action of the fire and also made a series of successful experiments in the adaptation of anthracite coal as fuel for locomotive engines. The science of mechanics was his life-long study, and the locomotive the special object to which he devoted the energies of his constructive genius. In this line of invention he achieved quite a wide reputation. In his capacity of Master Machinist of the Reading road, he took a great interest in the advancement and welfare of the young mechanics in his employ, many of whom were indebted to him for valuable instruction, encouragement and assistance.

In 1866 he resigned his connection with the Reading road to accept the Presidency of the Consolidation Coal Company, and Cumberland & Pennsylvania Railroad Company, whose extensive works are located at Mt. Savage, Md. Of this railroad company his eldest son, Mr. James A. Millholland, is at the present time Vice-President. In the spring of 1869 Mr. Millholland gave up this position and returned to Reading. In April, 1870, he went into the banking business with his father-in-law, Mr. John Hoff, recently deceased, under the firm of Hoff and Millholland.

Having always been identified with the Republican party, he was in 1872 its candidate for Congress in this, the Berks district, against Hiestes Clymer, the present member, receiving 7,783 votes to 13,854 cast for his opponent. He was also one of the partners in the Leepoot Iron Works, and was prominently identified with the business interests of the city and county. He was at the time of his death a member of the Board of Directors of the Reading Fire Insurance Company, of the Reading Library Company and the Charles Evans Cemetery Company. For over twenty years he was a member of the First Presbyterian Church, where his funeral will take place this (Saturday) afternoon, at 2 o'clock. He was a prominent member of the Masonic and Odd Fellows' Orders, being Post Commander of DeMolay Commandery No. 9, Past Master of Chandler Lodge No. 227, and Past High Priest of Reading Chapter No. 152.

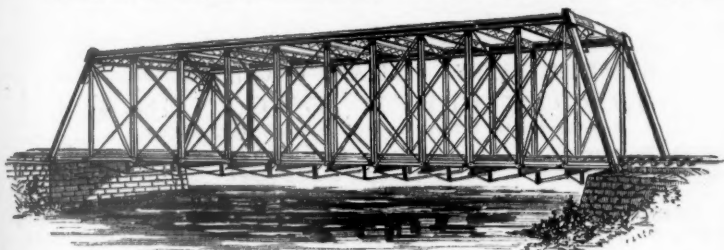
Personally, Mr. Millholland was distinguished for his great energy and decision of character, the indomitable resolution and perseverance with which he adhered to his plans and purposes, and an unswerving integrity, which prompted him in all his private relations, to be just toward all men. Added to these was a frankness and generosity of disposition which made him many friends. In his decease Reading loses an esteemed and valuable citizen.

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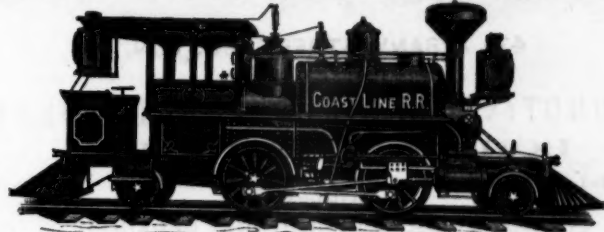
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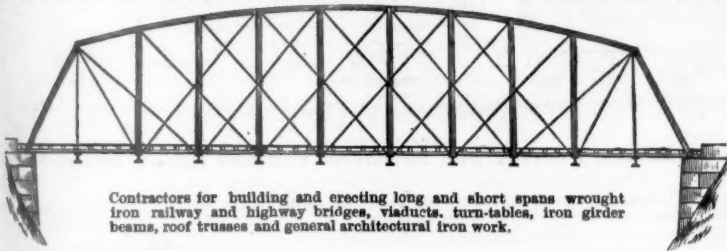
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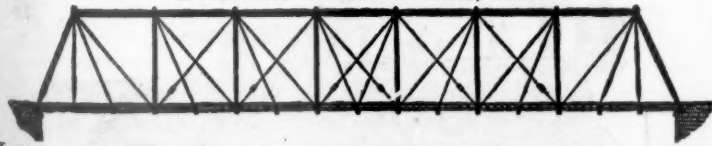
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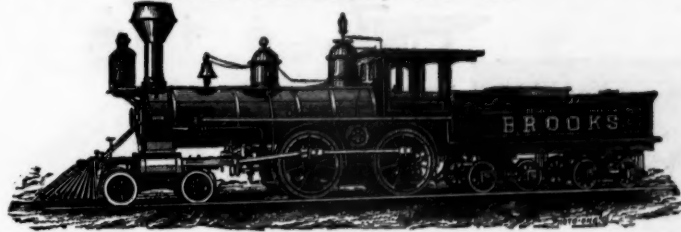
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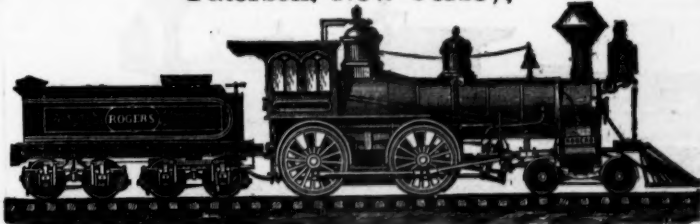
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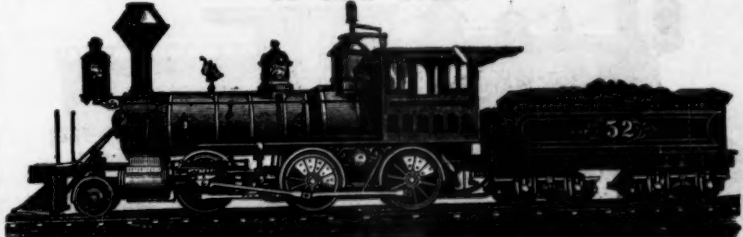


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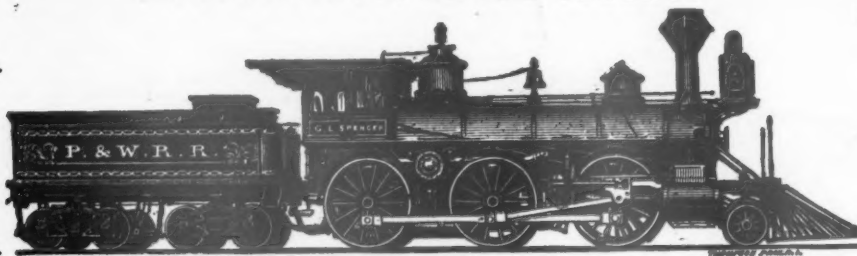
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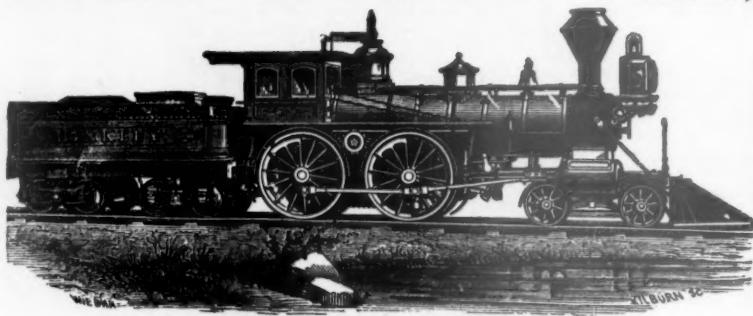


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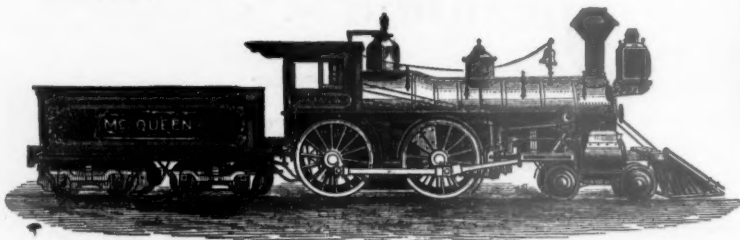
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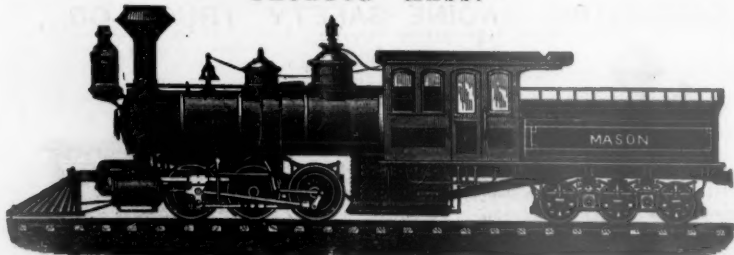
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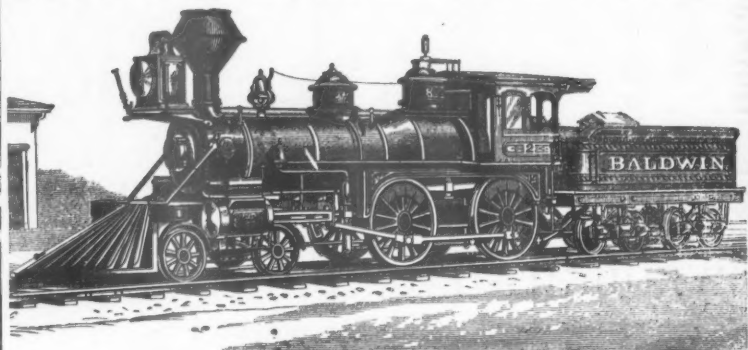
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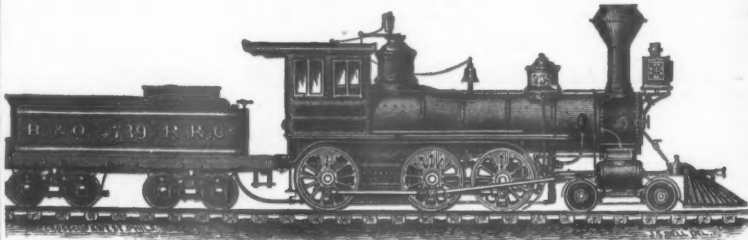
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